

7 INFRASTRUCTURE, PUBLIC UTILITIES & SERVICES

Infrastructure is the key determinant to the community which decide the functions towards their socio-economic development of the city. Facilitation of sustainable development the physical and social infrastructure are very much essential. Physical and social Infrastructure is the basic requirement which decides the quality of urban and rural life & overall productivity of the people. This chapter deals with the analysis of existing conditions of physical infrastructure such as Water Supply, Sewerage System, Solid Waste Management and Power as well as social infrastructure viz., Health and Educational facilities. Based on the analysis and clear understanding of existing scenario, future predicted the physical and social infrastructure for the projected year 2045.

In the formulation of infrastructure plan, attention was given to the followings.

Emergency task is to directly respond to the basic needs of physical and social infrastructure both for the present communities and new settlement of the returnees.

Needs survey at the community level is a fundamental study for preparation of urgent rehabilitation and development programs for basic physical and social infrastructure. The plan is to be prepared as practicable and flexible one by staging the needs and level of services of basic infrastructure.

Institutional strengthening and capacity building will be carried out through actual planning and construction of the basic infrastructure, at the community, state government and GOSS levels.





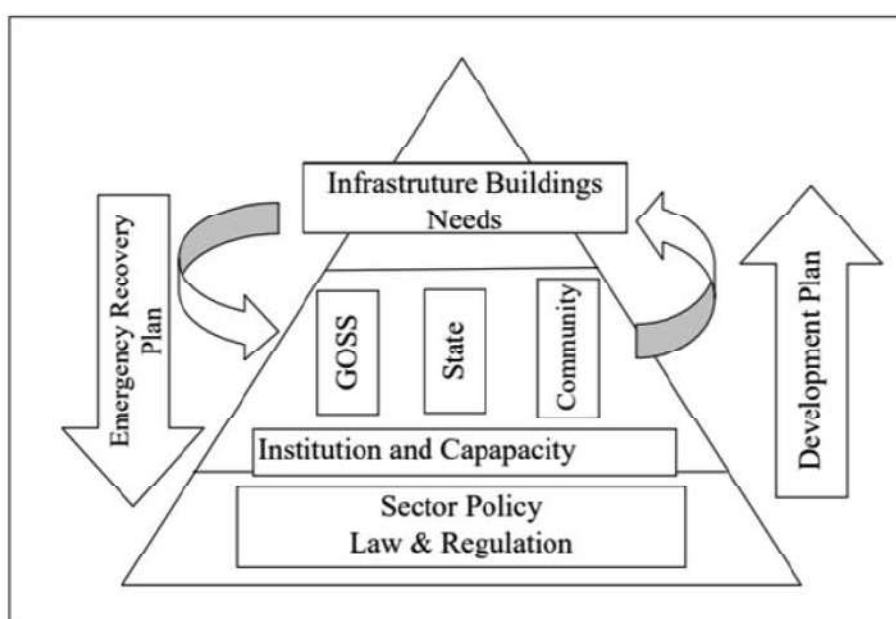


Figure 159 Conceptual Constitution for Infrastructure Plan

7.1 PHYSICAL INFRASTRUCTURE

Infrastructure is the basic physical structures needed for the operation of a society for an economy to function and physical networks that support society. Socio- economic growth of a town/city and the physical Infrastructure development in the town. Urban physical infrastructure (UPI) is one of the major assets of a city in terms of capital investment, critical services provisioning, and sustainable and resilient urban development. UPI includes physical objects like roads, sewerage, energy networks. Various data regarding details about amount of water supply, Hours of Supply, number of bore wells, details of sewerage system viz. capacity of STPs and details of drainage etc. have been procured from Public Health Division of PWD, Silchar.

Silchar Master Plan Area has the population of 4,71,709 (Census, 2011) and the population is projected to increase up to 8,06,933 for the horizon year 2045. Therefore, in order to meet the future demand, calculation of the same for various sectors is necessary and the same is dealt with in this chapter.

7.1.1 WATER SUPPLY

Urban water supply infrastructure has often been designed with a focus on treatment and distribution and with only minimal consideration of source water characteristics. Sustainable urban water supply systems must link more closely with the natural water systems in which they are located. one of the important and essential resource of Water for the development any Region, saunter supply of the suffice the domestic, industrial and irrigation requirements within the planning area. Presently the planning area is influential on both part of ground and surface water sources to address the water requirements of the area. Due to the non-contiguous geomorphic nature of the planning area and for better management water supply within the planning area is divided into two, urban area and rural area.

7.1.1.1 Existing Water Supply Project under Execution

Water supply is one of the important infrastructure services for a city/town and a proper supply of water for its population ensures the city have strong basic infrastructure. The map showing the boundary of the area covered by AMRUT project for water supply is given in the next figure. Total water supplied quantities is 29 MLD and the main source of the water supply is surface water of Barak river. Existing domestic house service connections are 17900 nos and other connections are 300 nos.

Table 170 Water supplies provisions under AMRUT drinking water project

Sr. No.	Particulars	Details
1	Total Households Connection to be catered by 2020 (approx..)	Total Projected: 35383 nos. Existing: 17900 nos. Under AMRUT: 10854 nos. By Other funding: 6629 nos.
2	No. of Zones	15
3	Sources of water	Surface water (Barak River)
4	Capacity of Water Treatment Plant (WTP)	Total Projected: 71.1 MLD Existing: 29 MLD Under AMRUT: 27.1 MLD Provision for additional capacity for year 2050: 20 MLD
5	Number of Over Head Reservoirs (OHR)	Total Projected : 15 nos. Existing: 5 nos. Under construction: 4 nos. Under AMRUT: 3 nos. Other funding: 3 nos.
6	Total capacity of Over Head Reservoirs (OHR)	Total Projected: 19500 cum Existing: 2250 cum Under construction: 1800 cum Under AMRUT: 6750 Other funding: 8700 cum
7	Approx. distribution network	Total Projected: 253.8 km Existing to be used: 37.3 km Under AMRUT: 115.3 km Other funding: 101.2 km

(Source: Water Supply project, AMRUT)

Water supply project under exwcution for Silchar city under central government AMRUT scheme. Total projected water supply capacity is 71.1 MLD by connecting 35383 households of city under this scheme. As on now already 17900 household are benifiting the treated water supply from surface water reservoir. For this, 5 ESR was created in phase-1 on different locations like, Sadarghat, Goniala, Gurucharan Collage, Tarapur and at Madhurbond. The details of each reservoir capacity mentioned further in detail.



Table 171 Water supplies existing and provisions under AMRUT urban drinking water project, under execution

Sl. No.	Name of the tank	Name of commune	Full Tank (Ltr)	Full tank depth (meter)	Remarks
1	Underground reservoir at Sadharghat treatment plant	Park road, D.C office Campus, Sadarghat, Janigunj	1800000	4.27	
2	Underground reservoir at civil hospital road campus	Public school road, Hailakandi road, Sonai road	900000	3.30	
3	Underground reservoir at Dhaccaiya patty	Malugram	700000	5.00	Newly constructed yet to be operational
4	Elevated services reservoir at Sadgarghat Treatment plant.	Park road, D.C Office Campus, Sadharghat, Janigunj	450000		Performing
5	Elevated services reservoir at Gurucharan college campus	Subhashnagar, Mission road, Ambicapatty	450000		Performing
6	Elevated services reservoir at Ghoniala	Malugram ,Itkhola, Ghoniala	450000		Performing
7	Elevated service reservoir at Tarapur	Tarapur SP office, E&D coloney	450000		Performing
8	Elevated service reservoir at Madhurbond	Madhurbond, Fatakbar, Chamra Gudam, Bilpar	450000		Performing
9	Elevated service reservoir at civil hospital	Radhamadhab road, public school road, Deshabandhu road, hospital road	450000		Newly constructed yet to be operational
10	Elevated services reservoir at E & D coloney	E&D colony, Silchar-Karimganj road, Masimpur road	450000		Under construction yet to be operational
11	Elevated services reservoir at madhura much	Madhurghat, Itkhola ghat, Ghoniala, Malugram	450000		Newly constructed yet to be operational
12	Elevated service reservoir at subhasnagar	Subhashnagar, college road, Sman road	450000		Under construction
Total			2250000		Existing

(Source: Water Supply project, AMRUT)

7.1.1.2 Calculation of Future Demand Projections

In order to calculate the demand for a projected year, it has to be calculated for certain stages as per CPHEEO Manual. The four stages are mentioned below:

1. Intermediate Stage (20 years from the base year) - 2031
2. Ultimate stage demand (35 years from the base year) - 2045

The water supply demand should include the fire demand, institutional demand etc. as per the CPHEEO guideline. In order to calculate the demand, it is essential to calculate the projected population for the defined stages. The domestic water supply demand is taken as 135 lpcd. The Projected population considered for this project is as under

Table 172 Water Demand assessment for Water Supply Source & Rehabilitation System

Sl. No.	Particular	2011			2021			2031			2045		
		Popu lation	Amount of Water supply (lpcd)	Total demand in MLD	Popu lation	Amount of Water supply (lpcd)	Total demand in MLD	Popu lation	Amount of Water supply (lpcd)	Total demand in MLD	Popu lation	Amount of Water supply (lpcd)	Total demand in MLD
Year													
1	Demand for existing	471709	135	63.68	559588	135	75.54	657796	135	88.8	806933	135	108.9
2	Fire Demand $100*((\text{population})/1000^{*1/2})/1000$			2.1			2.3			2.5			2.8
3	Unaccounted Water (15%)			9.5			11.3			13.3			16.3
4	Total Demand			75.28			89.14			104.6			128

As it is seen from the above table, the total demand for 2021 is 89.14 MLD and for final stage is 128 MLD. Currently, total water being supplied to Silchar is 22.5 MLD. The total deficit for base year is 66.64 MLD and for the final stage it is 105 MLD.

To meet the future demand, following proposals have been made under this project:

7.1.1.3 Summary of Water Demand

Table 173 Summary of Water Demand for 2045

Sr. No.	Particulars	Particulars Demand for 2045
1	Total Projected Population for MPA	806933
2	Water Demand @ 135 lpcd for planning area in 2045	108.93 MLD
3	Fire Demand + Unaccounted Water	2.8+16.3) =19.1
4	Total Water Demand	128 MLD
5	Total water demand including Water loss @ 15% of water demand	19.2 MLD
6	WTP Capacity	147.2
7	Storage – CLSR @ 67% of WTP	98.49
8	Storage – ESR @ 33% of WTP	48.57

(Source: Compiled using CPHEEO guidelines)

The Water Demand of entire planning area for 2045 will be around 128 MLD, considering fire demand and 15% of water losses (Source: CPHEEO manual for water supply) during water supply. In absence of water treatment plan in planning area, to metegate urgent need of Water Treatment Plant, additional GLSR & OHT storage of respectively 98.49 and 48.57 MLD is to be provided considering the future requirements of year 2045. The capacity of OHT and CLSR are worked out based on the thumb rules set for calculating storage capacity.

7.1.1.4 Proposed Strategies

There is an additional requirement of 124.7 MLD (existing supply 22.5 MLD) water to meet the drinking water demand of Silchar Planning Area by horizon year 2045. As ground water potential of the area appears reasonably enough to support the drinking water needs, the present trend of relying solely on it may continue. But, apart from providing individual tube wells, a system of collector wells (cluster of tube wells) with an arrangement for treating the raw ground water is recommended for safe drinking water. Majority of the drinking water demand can be met using the surface/sub-surface flow of River Barak as a source of supply through collector wells/intake wells.

Action Plan

- Planning, design and implementation of a sustainable water supply scheme mainly based on surface/sub-surface/intake wells water supply from the river Kalong and ground water
- Covering the entire planning area with a continuous water supply system assuring 24 hr supply with adequate pressure in the distribution system even at the tail ends
- Controlled use and management of ground water assuring treatment with disinfectants before distribution
- Public awareness against misuse of water
- Adequate reforms so as to balance the O&M cost with the revenue out of the water supply distribution

For areas outside conurbation, respective Commune Panchayats will have to arrange for the water supply without hampering the environment.

Rainwater Harvesting

Rain water harvesting must be made mandatory in newly developed houses to increase ground water potentials.

Desilting of Tanks

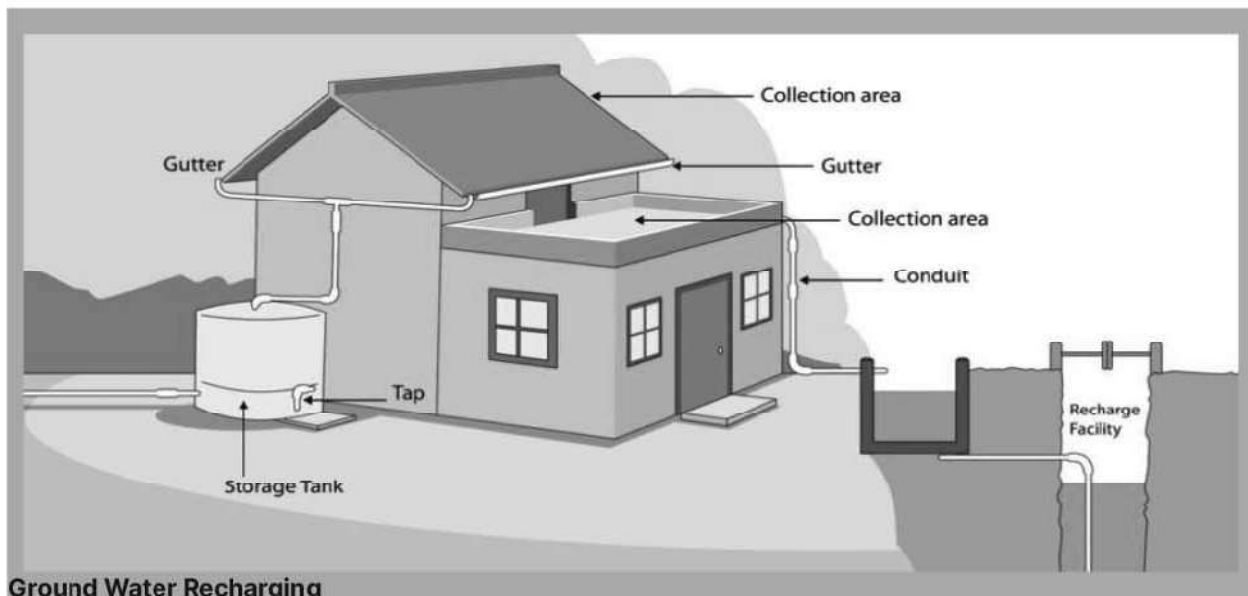
The water tanks located outside conurbation area are recommended to undergo desilting process. This will increase the capacity of the tanks and ultimately lead to better ground water recharge.

Ground Water Recharging

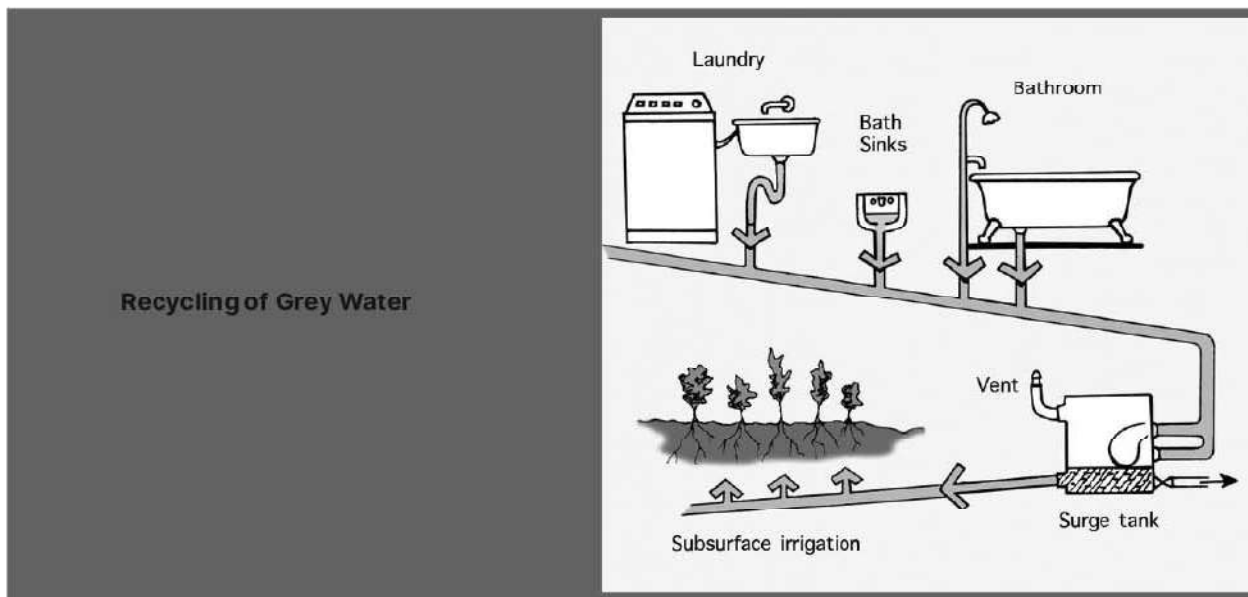
As agricultural land is being converted to urban use, identifying sites for additional groundwater recharge is essential to keep water supplies balanced. The existing village tanks which are normally silted and damaged can be modified to serve as recharge structure. The village tanks can be converted into recharge structure. Several such tanks are available which can be modified for enhancing ground water. Construction of Percolation well is also an option for ground water recharge.

Recycling of Grey Water

Recycling of Grey Water is proposed for Car wash, landscaping, industrial cooling, flushing etc. Recycling of Grey Water should be promoted.



Ground Water Recharging



Recycling of Grey Water

7.1.2 SEWERAGE SYSTEM

As at present, Silchar does not have an integrated planned sewerage management system, and majority houses in the city have septic tanks, of which many are not maintained well; hence, overflowing and dysfunctional. In fact, many septic tanks are now non-functional because of the high water table, and as a result, much of the untreated wastewater directly flows into the storm water drains or into the natural drainage channels. It is a high time that the authority plan and implement proper public wastewater collection and disposal system to ensure that sewage or excreta and sludge discharged from communities is properly collected, transported, treated to the required degree and finally disposed off without causing any health or environmental problems.

7.1.2.1 *Estimated Wastewater Generation*

The total water requirement for the Master Plan Area is 128 MLD (by the year 2045). As per CHPEEO guideline, 80% of total water demand is considered as the sewerage flow; therefore, around 87 MLD water is expected to go in sewerage lines. As time passes, the area is expected to grow and along with high water demand, there will be larger wastewater discharge; hence, the project area required systematic sewerage system so the wastewater will not be discharged in the natural drains, which will help in reducing the flood problem.

There should be underground sewerage connection to each households and from where the discharged wastewater should go to sewerage treatment plant before discharging it into the natural drains. While planning for the proposed sewerage system, consideration should be given to the natural drainage pattern. The sewerage system should be planned in such a way that there will be minimum pumping involved in collection and conveyance of sewage. New Sewerage Treatment Plant (STP) sites should be identified depending on considerations such as the quantum of environmentally suitable land, and availability of government land, capital and O&M cost of different options. While the underground sewerage is been planned and implement, the authority needs to make sure that each household in the region has a septic tank installed and is being managed and is fully functioned. Water from commercial and industrial activities wastewater is being treated before discharging in the river.

7.1.2.2 *Issues*

- **Absence of Sewerage system:** there is absolute absence of sewerage system in Silchar planning area resulting in discharge of un-treated waste water in drains and river Barak.
- **Mixing of storm water and sewage:** In absence of sewerage and improper drainage system, in many parts of planning area, there is discharge of sewage into storm water drains and other water bodies.
- **Maintenance of Septic Tank:** As per the present practice, the septic tanks are the only mode of disposal of sewage in Silchar planning area, which are not frequently cleaned by the Silchar Municipal Board.
- **Open Defecation:** Open defecation in slums and rural areas can be seen throughout the planning area and no efforts are taken till date.
- **Degradation of natural water bodies:** The disposal of waste water into river Barak and in other water bodies resulting degradation and contamination of water and land.

7.1.2.3 Proposed Strategies

In a modern society, proper management of wastewater is a necessity, not an option. A wide range of communicable diseases can be spread through elements of the environment by human and animal waste products, if not disposed properly. The development of effective water and wastewater treatment methods has virtually eliminated major water borne epidemics in developed countries.

Developing countries like ours, where treated water is not available to a majority of the population, still experience epidemics like cholera and typhoid. It is also to be mentioned that as per the report of the Planning Commission for the Tenth Five Year Plan, which emphasizes that all cities, towns and industrial areas should compulsorily have sewage treatment plants and are to be implemented in a time bound manner. Advanced waste water treatment process is currently being so developed that it will produce palatable water from domestic wastewater.

Recommendations

- For treatment of waste water generated from the planning area, a decentralized wastewater treatment system would be more appropriate. The centralized sewage treatment system appears inappropriate as it may end up with very huge sizes of sewers and various issues of conveyance in handling this huge quantity of wastewater.
- The treatment plants and sewers are to be so aligned as to reduce the number of crossings with railway tracks and National Highways of the area. The proximities of natural drains for treated effluent disposal, minimum obstructions for laying sewers, and the possibilities of acquiring land for sewage treatment plants (STPs) turns important in orienting and locating the plants.
- The possibilities of re-use of treated wastewater effluent for irrigation, gardening etc. should be looked into.
- The construction of treatment plants could be carried out in a phased manner on a modular/zonal basis in the planning area consistent with the future development/demand.

7.1.2.4 Proposal for STP

There should be underground sewerage connection to each households and from where the discharged wastewater should go to sewerage treatment plant before discharging it into the natural drains. While planning for the proposed sewerage system, consideration should be given to the natural drainage pattern. The sewerage system should be planned in such a way that there will be minimum pumping involved in collection and conveyance of sewage. New Sewerage Treatment Plant (STP) sites should be identified depending on considerations such as the quantum of environmentally suitable land, and availability of government land, capital and O&M cost of different options. While the underground sewerage is been planned and implement, the authority needs to make sure that each household in the region has a septic tank installed and is being managed and is fully functioned. Water from commercial and industrial activities wastewater is being treated before discharging in the river.

Considering these guidelines, and the water flow direction, the Master Plan prefers to have the possible locations for the STP sites far off from the contiguous urban developable area. The possible suitable locations of individual site are as mentioned below,

1. The site is identified at nathpara near tarapur with lat-long 24°51'2.32"N, 92°46'11.91"E. The site is on barak river bank on right side of SH 38- Kalain road from city centre to tarapur. The site is hardly 3.5 km away from city centre.
2. The site is identified at Dadripar near with lat-long 24°47'56.50"N, 92°49'52.29"E. The site is on barak river bank on right side of Lakipur road from city centre to Dadripar.

7.1.3 STORM WATER DRAINAGE SYSTEM

In Silchar town, it has been observed that the only system for sewerage during 1991 was open surface drains. However, during 2001 and 2011, the most prevalent system of sewerage is open surface drains and pit system.

Like every other city, the Silchar town is also facing the problem of waste and garbage disposal in a huge way. Earlier when the city expansion and the growth of urbanization was low the amount of waste and garbage generated was less but now with the increase in population and economic activities, the waste generated every day is also huge.

The municipality takes away and dumps the garbage in the dumping ground, but the effort is minuscule to the amount of garbage. Because of the lack of proper garbage disposal system, people dispose them in the open spaces, khals, drains, open grounds. Virtually it is seen that garbage mainly plastic bags are dispensed in roads, canals, drains in all over the town.

Moreover, there is lack of proper marketplaces and vegetable vendors, fish vendors, fruit vendors sit nearby the road and do their business activities and generating large amount of garbage every day. The authorities are facing a tough challenge to keep town clean and seldom face criticism from the public.

There are total 976 number of Lane and Bye-Lanes drains within Municipal Board area along the roads. The recorded total length of drain within Municipal area is 106239 mt. Out of which 65% are Pucca drain and only 8% are covered drain generally utilized as footpaths for pedestrian along roadside.

Table 174 Total drains in SMB

Sr. No.	Drains	Length of Drain (metre)	Percentage(%)
1	Both side drains in above passage	68454	-
2	Single side drains in above passage	40624	-
3	Kutcha drains	28606	27%
4	Pucca drains (Open)	69550	65%
5	Pucca drains (Covered)	8083	8%
Total Length		106239	100 %

(Source: Silchar Municipal Board)

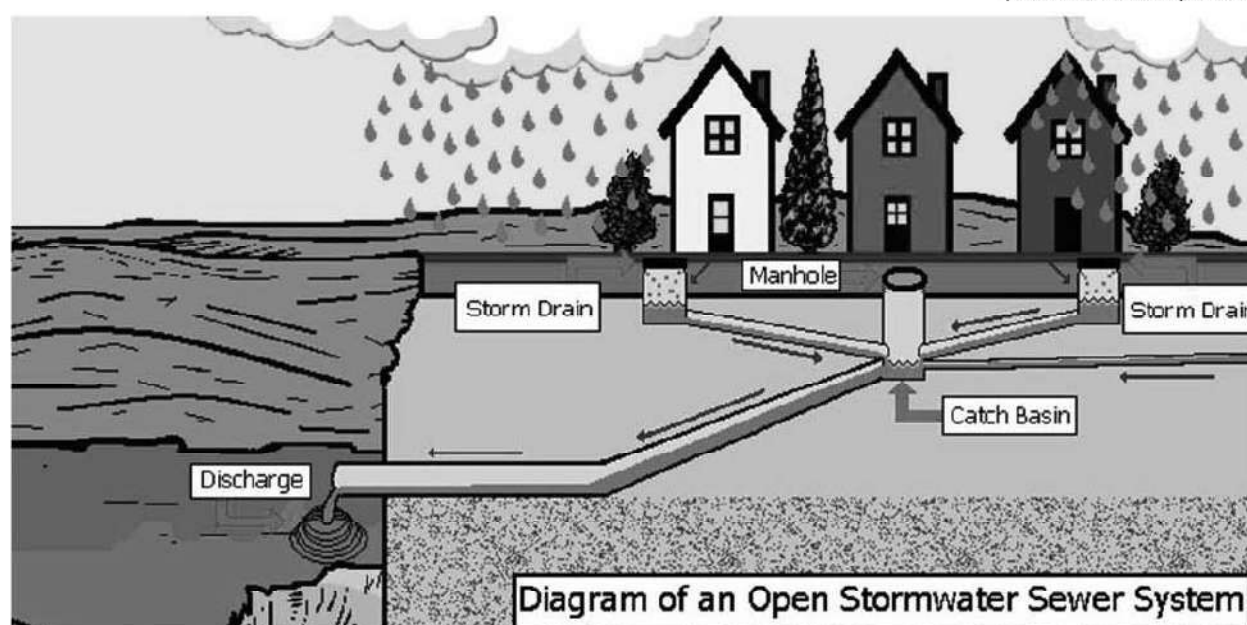


Table 175 Ward wise drains typology in SMB

Wards	Kutchha Drain (mt)	Pucca Drain (mt)	Pucca closed Drain (mt)
1	496	1458	496
2	1170	3043	189
3	1402	147	188
4	827	2740	192
5	508	297	0
6	10	167	203
7	90	670	471
8	116	608	144
9	164	1807	120
10	154	1224	265
11	0	2429	439
12	49	4156	293
13	107	1341	176
14	3113	3306	189
15	68	3227	161
16	6479	10274	207
17	2806	4658	459
18	1416	4723	406
19	3947	1831	353
20	200	2984	130
21	80	3031	388
22	55	3320	422
23	0	106	309
24	686	1196	59
25	905	2392	648
26	2862	2054	589
27	341	4159	360
28	553	2194	219
Total	28604	69542	8075

(Source: Silchar Municipal Board)

The Assam Urban Infrastructure Investment Program is a key urban infrastructure initiative of the Government of Assam. The investment program aims to provide improved access to water supply, sanitation, and urban infrastructure facilities to the urban population in Silchar. The project uses a multi tranche financing facility (MFF) modality and, requires the preparation of a Resettlement Framework and Resettlement Plan for all subprojects under the Program. The major outputs of this program include improved drainage in Silchar to reduce economic losses due to flooding, and comprehensive SWM. The Plan states infrastructure bottlenecks and lack of long-term funds for infrastructure investment, is one of the main constraints for growth.

The project components may include improvements of drains which will reduce flooding in Silchar town. It includes all major drains of the town, including the natural main drain and key lateral drains for improvement.

The benefits would be improved environmental and living conditions and public health in Silchar. In addition, the economic benefits considered due to the proposed project are: (i) reduction of household healthcare cost due to flooding and water logging problems; (ii) reduction in person-days lost due to water logging

and flooding; (iii) reduction in temporary resettlement cost due to flooding; (iv) reduction in annual cost of protection measures from flooding; (v) reduction in annual agricultural loss; and (vi) reduction in road maintenance cost.

7.1.3.1 Issues and Requirement

Open Channel Area:

- Closed channel water drainages are observed on many streets within municipal board where some streets are under progress.
- Unhygienic condition due to open channel leads to spread of diseases.
- It also leads to high health risk due to illegal discharge of wastewaters and solid waste.
- Another issue includes foul odour source establishment and becomes a breeding ground for insects and pests.
- Regular cleaning service is not done to remove solids from the open channel area which increases the chances of blockages which can cause spill-over and flooding.



Ramnagar-Manipur market



Mizoram Road

Flood Prone Areas:

- Many low-lying areas are found under water logging within the city area.
- Due to absence of storm water drain, the rainwater and the flash water, in monsoon, are unable to flow down stream and due to this the area becomes prone to water logging.
- At many places, the accessibility on pavement hinders due to presence of water logging and hence sometimes become a reason for traffic congestion.
- The major flood prone areas include Ambikapatty, Sonai Road, Church Road, Rangirkheri and Park road junction to Civil Hospital. Vivekanand road, Fatak Bazar road and Capital Point are observed low lying areas where frequent water logging happens in rainy season.

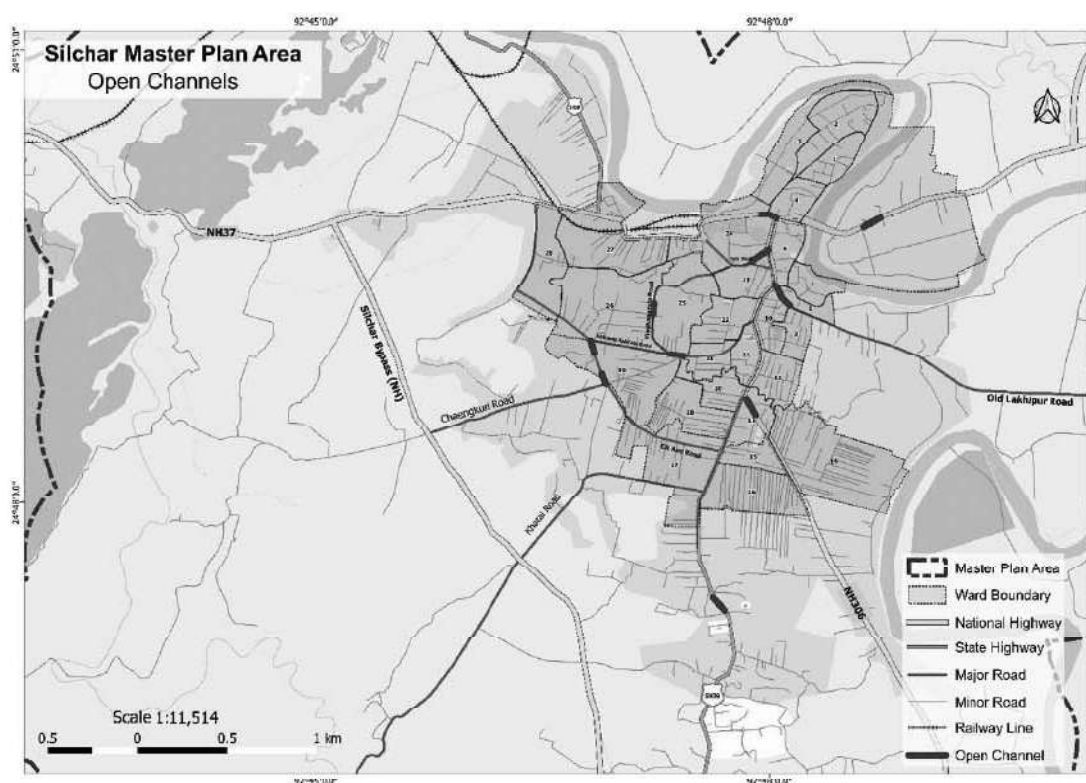
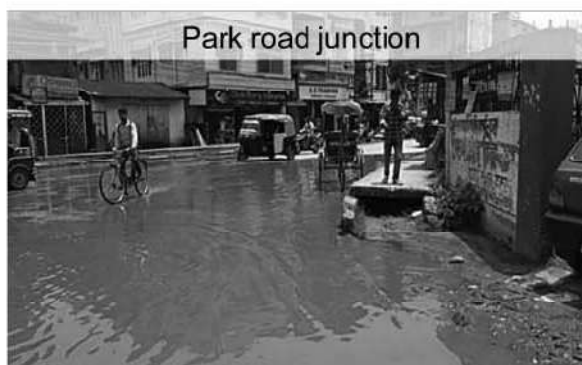


Figure 160 Open channel and flood prone areas



7.1.3.2 Proposed Strategies

A separate storm water drainage network has been proposed in the development area for the collection and safe disposal of storm water during rainfall. The design criteria to be followed for design of Storm Water Drainage network are broadly based on the recommendations as laid down in the CPHEEO Manual of Sewerage and Sewage Treatment, Ministry of Urban Development, Government of India and as per provisions laid down in the relevant I.S. Codes and Consultants' past experience in related field.

- Rectification of slope and width of drains shall be done, wherever required.
- Provision of new storm water drainage network as per phase wise requirements worked out considering key parameters of precipitation intensity, catchment delineation, percolation characteristics and surface runoff.
- Existing drains which can be used as storm water drains, need to be upgraded based on engineering aspects & runoff calculation.

7.1.3.3 Recommendations

- The lack of proper sanitation and solid waste management, combined with indiscriminate dumping of solid waste in the drains reduces the carrying capacity of these natural drains. The implementation of a systematic solid waste and wastewater collection and treatment system is a necessary prerequisite for proper drainage of the area.
- The natural drains have been encroached upon and are almost in dilapidated state. Also, at many reaches the drain sidewalls are found to be damaged. The section of the drain is also irregular and less adequate at many locations. Proper gradient is not maintained at several stretches on its reach and the hydraulic parameters are also not uniform. Also, no definite drain section is maintained in many reaches. So, proper maintenance and management of the existing natural drains turns important. This necessitates a proper evaluation of the existing natural drainage system.
- Over the years the River Barak has progressively silted up due to which the flood water flows at ever higher levels than the water levels in this main drain.
- The natural depressions and ponds, which were instrumental in preventing excess storm run-off, are getting filled up at a rapid rate due to urbanization. This may further aggravate the existing problem of water logging. It is necessary that 'natural sinks' be retained as such as, they are instrumental in controlling the water logging of the area.
- An organized drainage system is invariably associated with the implementation of a systematic solid waste and wastewater collection and treatment system.
- Periodic de-silting of the existing storm water drains should be done.
- Perimeter protection of all the major drains should be checked before every rainy season.
- Overall, the preparation and implementation of a master drainage plan appears essential for Silchar Planning Area.
- All roads of the town/city should have side-drains, which will serve as minor or tertiary drains.
- Existing drains which can be used as storm water drains, need to be upgraded based on engineering aspects & runoff calculation.
- A plan for the drainage of some of these areas has been prepared. The implementation of a master drainage plan for these areas appears very essential.

7.1.4 SOLID WASTE MANAGEMENT

At present, Solid waste management is one of the major challenges the Silchar city is facing. The city has a formal garbage collection, and disposal system, which is insufficient to cater the total garbage generation in area and as a result it is affecting the living environment in the city.

7.1.4.1 Solid Waste Management in Urban Area

Presently, the solid waste generation in SMB area is 105 MT/Day whereas collection is 100.82 MT/Day as per Municipal Board record. Out of total collected waste, 52.85 MT found Dry, 41MT as Wet, 3 MT Plastic, 2 MT mixed and 0.2 MT hospital waste. No. of household covered in door-to-door waste collection are 3500 as per Municipal Board record. Vehicle deployed in Solid waste collection system are 17 Trippers, 50 Tricycles, 3 Hand cart, 06 JCB, 5 Tractor and 1 Compactor. Manpower deployed for door-to-door collection are 46.

Citizens have habit of throwing garbage on streets, into the open drains, in the backyards, and in the open spaces. This section proposes explains the foreseen solid waste generation and the management for the same in the project area.

7.1.4.2 Quantity of Waste Generated

The quantity of MSW generated depends on numerous factors such as population, food habits, standard of living, degree of commercial activities and seasons. The increasing urbanization and changing lifestyles have increased the waste generation rate of Indian cities.

Criteria for assessing waste generation

- Projected populations for the design period
- Existing per-capita waste
- Annual rate of increase of per capita waste generation.

7.1.4.3 Solid Waste Demand Projection

Based on the CPHEEO standards, following assumption were considered while estimating the volume of the solid waste and required area for the landfill site for the proposed urban population for the horizon year 2045:

- It is assumed, that MSW will be collected by responsible authorities at regular basis
- Characteristic of the collected MSW in the region will be the in consistent with the characteristics mentioned in CPHEEO manual.
- Per Capita Solid Waste Generation-270 Grams per Capita per Day.

Table 170 Future assessment of Solid waste Generation

Sr. No.	Particulars	Demand for 2045
1	Projected Population	806933
2	Solid Waste Generation (in Conurbation area @270 gms/cap/day)	217.87 MT

7.1.4.4 Issues in Present System

Lack of Disposal Site

Presently, there is no engineered landfill, and Municipal Solid Waste is dumped in open area, which can lead to ground water and soil pollution, vector naissance etc.

Lack of Primary Collection System

Solid waste is discharged by establishment into open plots, open drains etc. these un-organized disposal methods have resulted in the accumulation of solid waste on roadsides, vacant plots, and storm water drains. This has resulted in a number of hygiene related problems such as breeding of flies/ mosquitoes and stray animals.

Un-hygienically Solid Waste Transportation

Municipal Solid Waste is transported primarily in open vehicles i.e. trucks, tippers and cycle rickshaw. It is also observed that these modes of transportations are overloaded with MSW, resulting in the littering of roads during transportation. The loading and unloading of waste are carried out manually, and Safai Karamcharis involved in these activities do not use any safety measures.

In-sufficient collection and disposal of construction waste

The construction and demolition waste generated by residents is transported in tractor trolleys and disposed at either secondary collection points or open/low-lying areas in the town vicinity.

Handling of MSW with Slaughter Waste

Waste from the slaughters houses is disposed in open dumping sites, although there are provisions for

separately disposing slaughter house waste in Silchar town / planning area.

Disposed of Bio-medical waste without any treatment

Presently, there is no treatment facility available for bio-medical waste in Silchar and Medical waste is disposed off along with general MSW.

Lack of primary Collection points

Unattended waste lying in open areas is common phenomena in the entire town because of non-availability of required numbers of bins in the planning area.

Multiple Handling of Wastes

The waste is handled multiple times leading to potential health hazards for the workers as all types of wastes contains hospital waste, human waste etc are disposed in the same containers.

Lack of Awareness

There is absolute lack of awareness among people w.r.t. handling and management of waste.

7.1.4.5 Proposed Strategies**Decentralized solid waste treatment system:**

The developmental pattern of all the areas, especially Silchar, demands the implementation of an integrated solid waste treatment system. It is felt that only a decentralized MSW Management System could help solve the seemingly intricate problem of solid waste treatment in this area in an economically viable, socially desirable and environmentally sound manner.

Public Participation:

General environmental awareness and information on health risks due to improper solid waste management are important factors which need to be continuously communicated to all sectors of the population. Building awareness among public and community about the need for a better solid waste management system is as essential as management. Public awareness and attitudes to waste can affect the people's willingness to cooperate and participate in adequate waste management practices. If people keep on throwing waste on the streets indiscriminately, the local body alone cannot keep the city clean in spite of their best efforts. Thus, it is very important to make people understand that the treatment and management of solid waste is a collective responsibility of the local authority and the community. Municipalities or local governments through participatory programs should convey this message to the people.

Collection Enhancement facilities:

- Old dustbins are to be replaced with different types of covered dustbins, which reduces the time of pickup and improves the process of primary collection of wastes.
- Sweepers may be provided with handcarts and detachable containers and be allotted a fixed area or number of houses for door to door collection. They should also be provided with safety gears and proper uniforms.
- It can be made compulsory for the management of societies/complexes to keep covered bins in which waste is to be stored at acceptable locations, to be picked up by the municipal staff.
- The local body may collect waste from community bins by using container handcarts or tricycles whichever may be convenient, for transferring the wastes to the waste storage sites by employing municipality sweepers.

- The collection service can be provided on a full-cost recovery basis using contractor services on a day-to-day basis from individual houses.
- The collection service can be provided on a full-cost recovery basis using contractor services on a day-to-day basis from individual shops also. The service of rag pickers and part-time sweepers can also be used in agreement with the shop owners.
- Sweeping of all public roads, streets, and lanes, by-lanes where there is habitation or commercial activities on either side of the street should be done daily. A list of such streets and roads together with their length and width should be prepared. The local body, keeping in view the norms of work prescribed should work out a program for their daily cleaning. However, roads and streets where there is no habitation around and do not require daily cleaning may be put in a separate group.

Provision of Solid waste Storage:

One of the immediate measures to revamp the existing collection services structure would involve provision of covered community waste bins at proper distances for the people to deposit domestic waste. This is the first step that will ensure that people do not throw their garbage on the roads and hence do not create open dump sites. This will enable the sanitation workers to transfer waste to the transportation vehicle quickly and efficiently with minimum health risk which will also help to maintain the aesthetics of the surroundings.

The Municipal solid waste (Management and Handling) Rules 2000 of the Government of India have prescribed the compliance criteria for waste storage depots as under:

- Storage facilities shall be created and established by taking into account quantities of waste generation in a given area and the population densities. A storage facility shall be so placed that it is accessible to users.
- Storage facilities to be set up by municipal authorities or any other agencies shall be so designed that waste stored are not exposed to open atmosphere and shall be aesthetically acceptable and userfriendly.
- Storage facilities or "bins" shall have "easy to operate" design for handling, transfer and transportation of waste. Bins for storage of biodegradable waste shall be painted green, those of recyclable waste shall be painted white and those of other wastes shall be painted black.
- Manual handling of waste shall be prohibited. If unavoidable due to constraints, manual handling shall be carried out under proper precaution with due care for safety of workers. So, the storage and handling of SW are extremely important, and hence the steps to be taken by the Municipal authorities for storage of solid wastes are detailed in table below:



Table 177 Solid waste Generation Source

Sl. No.	Generation Source	Action Proposed
1	Residential	<ul style="list-style-type: none"> Not to throw any waste in neighborhoods, on streets, open space, and vacant lands, in drains or water bodies. Keep food waste / biodegradable waste in a non corrosive bin type – D1 Keep dry/ recyclable waste in bin type – D2 Keep hazardous waste separately
2	Multistoried buildings, commercial complexes, private societies	<ul style="list-style-type: none"> 1 to 4 as above. Provide separate bin type – B large enough to hold wastes generated both biodegradable and recyclable. Direct member of the association / society to deposits waste in bins provided. Sanitary inspectors should vigil the area and fines should be imposed for not following the actions
3	Slums	<ul style="list-style-type: none"> 1 to 4 as above. Use bin type –C
4	Shops, offices, Institutions	<ul style="list-style-type: none"> 1 to 4 as above. Store the waste in bin type – D1, D2
5	Hotels and restaurant	<ul style="list-style-type: none"> 1 to 4 as above They should arrange their own bins and dispose waste in nearby municipal bins
6	Vegetable, fruit markets, meat, fish markets, and street Vendors	<ul style="list-style-type: none"> Keep small baskets with them and transfer waste to large bin type-A. Shop keepers not to dispose of the waste in front of their waste or shops or open space. Deposit waste as and when generated into bin type-A. Fines should be imposed for not following the action
7	Marriage halls, Communityhalls, Kalyan Mondaps	<ul style="list-style-type: none"> 1 to 4 as above. Provide a large bin type –B
8	Garden Waste	<ul style="list-style-type: none"> Compost the waste in garden itself, if possible. Store wastes in large bags or bins and transfers it to community bins.

Note: Bin Type A (volume 7 m3), Type B (0.75 m3), Type C (0.5 m3), Type D1 and Type D2 (12 liters)

Segregation:

These compositional characteristics of the solid waste underline the need for proper segregation before treatment. Proper segregation of waste into different components and their separate collection can definitely lead to remarkable changes in the entire system.

The segregation of the waste would be a long drawn exercise as it involves attitudinal changes in people and will have to be done with careful planning, in a phased manner. The general public is to be first sensitized towards the whole concept and educated about the need and advantages of doing the segregation. Segregation of waste at the source itself is extremely important as municipal solid waste, which is otherwise environmentally benign on getting mixed with hazardous waste like paints, dyes, batteries, and human excreta turns hazardous. The recyclables like paper and plastic etc. become unsuitable for recycling as these get soiled by the organic matter.

Although, it would be more fruitful to sort and place different kinds of recyclables in separate receptacles, the waste could be segregated into at least two categories of biodegradable and non-biodegradable initially.

The recyclables obtained through segregation could be straightway transported to recycling units which in turn would pay certain amount to the corporations, thereby adding to their income. This would help in formalizing the existing informal set up of recycling units, and this formalization in turn could lead to multi-advantages. The biodegradable matter could be disposed off either by aerobic composting, anaerobic digestion or sanitary land filling. Depending upon land availability and financial resources, either of these disposal methods could be adopted. Though simple land filling is the traditionally practiced system of solid waste management in the planning area, aerobic composting by wind-row method will be an appropriate option. All the nonbiodegradable waste which is non-recyclable, non-reusable shall be dumped into sanitary

land fill. Biodegradable waste shall be subjected to composting. Area required for composting shall include the area for storage of unprocessed material, processing facilities for composting operation and storage for green compost.

The area required for windrow composting with 15 days composting period with moisture content between 55-60% for aerobic composting, the first turning shall be done at the 4th day and thereafter every third day shall be 1.5 acres to 2 acres per 50 MT per day waste.

Reuse and Recycling:

The concepts of reuse and recycling can well be applied in solid waste management as solid waste is basically a heterogeneous mixture. In typical Indian municipal solid wastes, there is a small percentage of recyclable material and more of compostable and inert materials like ash and road dust. There is a very large informal sector of rag pickers, who can collect recyclable wastes (paper, plastic, metal, glass, rubber, etc) from the streets, bins and disposal sites for their livelihood. Thus, the rag pickers can be effectively used for the collection of reusable materials especially because the use of non recyclable packaging materials like PET bottles for soft drinks, mineral wastes, and soft -foam products and metalized plastic film coated food packing materials are on the rise. During recycling, many of these release toxic gases and ozone depleting products. So it is advisable to educate people to replace these items with eco-friendly packaging materials. The desirable home sorting mechanisms includes dry recyclable materials (e.g. glass, paper, plastic, cans etc.), kitchen and garden wastes, bulky wastes, hazardous wastes, construction and demolition wastes. Sorting can also be done just prior to waste processing or land filling.

Energy from Solid Waste:

Electricity can be produced by burning MSW as a fuel. MSW power plants, also called waste-to-energy (WTE) plants, are designed to dispose of MSW and to produce electricity as a byproduct of the incinerator operation. Mass Burn is the most common waste-to-energy technology, in which MSW is combusted directly in much the same way as fossil fuels are used in other direct combustion technologies. Burning MSW converts water to steam to drive a turbine connected to an electricity generator. Burning MSW can generate energy while reducing the volume of waste by up to 90 percent, an environmental benefit. However, this burning MSW in WTE plants produces comparatively high carbon dioxide emissions, a contributor to global climate change. The net climate change impact of these emissions is lessened because a major component of trash is wood, paper and food wastes that would decompose if not burned. If left to decompose in a solid waste landfill, the material produces methane, a potent greenhouse gas. The concept of producing energy from MSW derives significance as it is given high priority by the Ministry of Non-Conventional Energy Sources (MNES), Government of India.

Treatment options:

The biodegradable portion of the waste is considerably high. So, aerobic composting of SW after proper segregation will be more appropriate. In selected locations especially in rural areas, Vermi-Composting can also be recommended. The manure obtained by these methods can be sold to the local public as fertilizer. Though costly, sanitary land filling can also be practiced at selected urban locations where the recovery from the waste will be very high, serving minimum ecological damage. It appears that the aerobic composting by Windrow method may be a desirable option for the management of the solid waste. The possibilities of generating energy from SW could be looked into on an experimental basis.

Biomedical wastes and its management:

Biomedical waste has been a growing concern because of the awareness in public regarding HIV, AIDS and Hepatitis B and exposure to discarded needles, syringes and other medical waste from municipal garbage

bins and disposal sites. The management of biomedical waste turns important as it has serious bearing on the quality of human life. This becomes more significant especially in the context of the recent trend of establishing multispecialty hospitals in urban centers. Biomedical waste can be regarded as any waste generated during the diagnosis, treatment or immunization of human beings or animals or produced due to activities of biological research, human anatomical waste, animal waste, microbiology and biotechnology waste, waste sharps, discarded medicines and cytotoxic drugs, solid wastes, liquid waste, incineration ash, chemical waste, etc. Medical wastes contain pathological waste (such as human tissues such as limbs, organs, fetuses, blood and other body fluids), infectious waste (soiled surgical dressing, swab material in contact with persons or animals suffering from infectious diseases, waste from isolation wards, cultures or stocks of infectious agents from laboratory, dialysis equipment, apparatus and disposable gowns, aprons, gloves, towels, etc.), sharps (any item that can cut or puncture such as needles, scalpels, blades, saws, nails, broken glass, etc.), pharmaceutical waste (drugs, vaccines, cytotoxic drugs and chemicals returned from wards, outdated drugs, etc.), chemical waste (any discarded solid, liquid or gaseous chemicals from laboratories, cleaning and disinfection) etc.

Implementation of Bio-medical Wastes (Management and Handling) Rules, 1998

The Ministry of Environment and Forests issued the Bio-medical Wastes (Management and Handling) Rules, 1998 which were amended subsequently. These rules provide for segregation, packaging, transportation, storage, treatment and disposal of wastes generated by hospitals, clinics and laboratories. Bio-medical wastes (BMW) have been classified into various categories and the treatment and disposal options for each of the categories are specified. The treatment and disposal should be in compliance with the standards prescribed in Schedule V, which stipulates standards for incinerators (operating and emission standards), for waste autoclaving, for liquid waste, of microwaving and for deep burial. A schedule for implementation of BMW rules has been laid down in Schedule VI. Imposing segregated practices within hospitals to separate biological and chemical hazardous wastes that will result in a clean solid waste stream, which can be recycled easily. An Advisory Committee is to advise the prescribed authority on the implementation of these Bio-medical wastes (Management and Handling) Rules.

7.1.4.6 Processing and Disposal of Solid Waste

The solid waste can be processed by composting, vermi-composting, anaerobic digestion, sanitary land filling, incineration or any other biological processing for stabilization of wastes. Since it contains a high amount of biodegradable portion, composting may be a cost-effective option for processing. The process of microbial composting or vermi-composting may be adopted with least mechanization to keep the cost low, and to market the compost as fertilizers to adjoining villages. So the concerned municipalities are duty bound to earmark required acres of land to meet the requirement of solid waste treatment. The areas of existing dumping yards can also be developed. The rejects from these plants and domestic hazardous wastes may be carefully landfilled. The bio-medical wastes may be disposed off as per the Bio-Medical Waste Management and Handling Rules as described above.

A decentralized treatment system will be more feasible option for solid waste treatment. In combination with primary waste collection, composting improves the precarious waste situation in the communities, and residents become less dependent on the poor municipal waste collection service. Decentralized composting can be operated by an appropriate technology and implemented at reduced investment and operating costs. Manual composting in small, decentralized plants is more easily integrated in the prevailing level of development in India and the socio-economic background, as it requires labour-intensive processes. It will create employment opportunities and a source of income to the underprivileged people in the rural Silchar. Decentralized composting allows reuse of organic waste where it is generated, thereby reducing waste quantities to be transported as well as transport costs. This may drastically reduce the overall cost of municipal solid waste treatment.

7.1.4.7 Proposals for Solid Waste Treatment

The solid waste generation expected in Silchar Planning Area by 2045 is very high, providing compost treatment facilities for this huge quantum of wastes, though essential, may not be practically possible in a single phase. So, it is necessary to propose economically feasible and, technically viable solutions which can be implemented in a phased manner. The densely populated urban areas of SMPA are to be given first priority in providing the composting facilities for solid waste treatment. The area required for solid waste treatment and disposal facilities will be 8 hectares.

Ideally, landfill site should be located in the area, which is at the distance from the residential development where people are not get directly in contact with the site. In addition, landfill sites should not be located in close proximity to parks, forest, wetlands, airport and unstable zones.

Considering these guidelines, and the wind direction, the Master Plan prefers to have the possible locations for the landfill sites far off from the contiguous urban developable area. Therefore, two different site locations have been identified by planning team and T&CP office. Below are the mentioned locations of individual site,

1. This site is located near NIT Silchar, at Silchar-Hailakandi road in left side around 1.5 km far from NIT entrance gate and 9.5 kms from City Centre area. This is plane land with no vegetation and away from residential development. The mouza Bharakai Grant falling outside Silchar Development Authority boundary.
2. The site is located at Durganagar pt III along Silchar-Dalu Mahasarak Road with la-long 24049'3.53" N, 92053'01.10" E. This site is approx. 9 km from city Centre beyond Master Plan boundary of SMP 2045.

1.7.4.8 Disposal of Hazardous Waste

The Notification from the Government of India, Ministry of Environment dated 20th July 1998, which deals with the collection of Bio-Medical Wastes entrusts the liability of its disposal with the waste producer itself. Thus the management of bio-medical waste is not the responsibility of Municipalities. But, however, they can assist in the management of biomedical wastes on a full cost recovery basis without sharing any legal responsibilities. It is advisable to have bio-medical facility for the entire Silchar Planning Area. The bio-medical wastes collected from spots can be stored in selective transfer stations and can be transported to this central treatment facility at village Kachamarigaon Western side of planning area. If so desired, the authorities can formulate an action plan for implementing this plant through some competent agencies and can suitably charge for the treatment and disposal of bio-medical wastes. The solid waste dumping sites closest to industrial sites will be a more appropriate option.



7.1.5 ELECTRIC ENERGY

7.1.5.1 Power Grid of Silchar Master plan Area

The present power demand of the city including that of the three regions of Silchar, area is 25.4 MW. At present there is no shortage in meeting the requirements of the present demand in any of the region. Present electricity demand of Silchar city and its adjoining small villages mentioned in the table below.

Table 178 Demand and Supply of Power

Sr. No.	Particulars	Details
1	Demand for energy	25.4 MW Peak Demand
2	Annually or monthly supply of power (refer table – 1)	Average 7 MU per Month

Table 179 Annual or Monthly Supply of Power of Silchar

(Source: APDCL, Silchar)

Type of Consumer	Demand (mw)	Supply (mw)
Residential	13.2	13.2
Government	1.2	1.2
Social and Institutional	1.9	1.9
Commercial	4.1	4.1
Industrial	3.2	3.2
Agriculture	1.8	1.8

7.1.5.2 Power Supply Demand Projection

(Source: APDCL, Silchar)

The present power demand is 25.4 MW. The power demand for 2045 is calculated by assuming 2.74 kWh per capita per day considering domestic, commercial, industrial and other requirements as per URDPFI guidelines 2015. The power demand for the 2045 will be 221.1 MW.

Table 180 Power Demand for 2045

Sr. No.	Particulars	Demand		
		2021	2031	2045
1	Projected Population	559588	657796	806933
2	Power Requirement @2.74 kWh per capita per day	153.33 MW	180.26 MW	221.1 MW

- Power demand – 2.74 kWh per capita per day considering domestic, commercial, industrial and other requirements as per URDPFI guidelines 2015

As per the population 2031 for Silchar Master Plan Area, the Power Demand is 180.26 MW considering 2.74 kwh per capita per day. The Power Requirement for 2045 will be 221.1 MW. The possibility of use renewable energy is to be explored and promoted. The strategies are proposed below:

7.1.5.3 Proposed Strategies

- There are various other sources, such as Wind energy and solar energy for generating power which is required to be explored.
- Additional solar energy to be sold to public grid/ electricity authority.
- Sector-wise power demand needs should be worked out which will be helpful in proper planning & estimating future power requirement.
- Incorporation of Renewal Power Obligations (RPO) in building byelaws (applicable to major building projects >20,000 sq.ft.)
- Tax concession on material and appliances procured for renewable energy products.

7.1.6 SANITATION

7.1.6.1 Existing Sanitation

Table 181 Household Sanitary Facilities (Town/Ward wise)

Ward No.	Septic tank	Ward No.	Septic tank
1	559	15	589
2	1013	16	1301
3	660	17	1233
4	723	18	1364
5	938	19	1269
6	482	20	559
7	498	21	780
8	515	22	1260
9	563	23	946
10	638	24	594
11	604	25	1174
12	825	26	1126
13	738	27	919
14	1245	28	704
		Total	23819

(Source: Silchar Municipality)

Table 182 Vehicles deployed for Collection and Disposal of Solid waste, Year 2020

Type of Vehicles deployed	Trucks/ Lorry	Tippers	Dumpers/ Placers	Tricycle	Tractor	Others
	3	17	1	50	5	6 JCB

(Source: Silchar Municipal Board)

Table 183 Segregation of solid waste, year 2020

Public toilets (In no.)	26 (2 hospital campus)
No of Toilets Pay & Use	2 under SMB
Users per toilet daily (in No)	-
Average User Charge	5rs.
Average yearly expenditure on maintenance (Rs. In Lakh)	-

(Source: Silchar Municipal Board)

7.2 SOCIAL INFRASTRUCTURE

Social infrastructure plays an important role to provide quality of life to the residents of the city. The effectiveness of social infrastructure in achieving the objective of city development plan would depend upon its capacity to contribute to improvement in the quality of life, enhanced self-dependency and city's sustainability. The level of social infrastructure shall aim the creation of liveable city through reducing the sense of alienation among the residents with less dependence on other settlements for basic infrastructure.

Social infrastructure refers to the facilities and mechanisms that ensure education, health care, community development, and social security, recreational and social welfare. The development cannot be looked at in isolation without considering the basic needs of the people, and a significant level of investment is needed in this sector. Usually this development referred to as the commitment towards realizing the vision of the city.

7.2.1 EDUCATION

Education is an important factor influencing the quality of life of the people and future development of an area. It empowers them with skills and knowledge and helps them to better lead their life and to access best of the employment opportunities available in the market. This in turn will impact the work force participation rate and economy of the area.

7.2.1.1 Educational Facilities in Pre-Primary & Secondary Education

The existing scenario of Primary, Middle school and Higher secondary school for the Silchar area is shown in the table given below:

Table 184 No. of Pre-primary Schools to Secondary Schools of Silchar Master Plan Area

Sl. No.	Description	Number
1	Pre-Primary Schools	80
2	Primary School	13
3	Higher Secondary School	31

(Source: Inspector of Schools, Elementary and Higher education)



Figure 161 Silchar Primary and Higher Secondary school Planning area

7.2.1.2 Educational Facilities in Higher Education

The existing scenario of university, Art/Science/Commerce colleges and professional colleges for the Silchar area is shown in the table given below:

Table 185 No. of Higher Educational Institutes

Sl. No.	Description	Number
1	University	1
2	Art/Science/Commerce Colleges	9
3	Polytechnic	1
4	Engineering college	1
5	Medical college	1

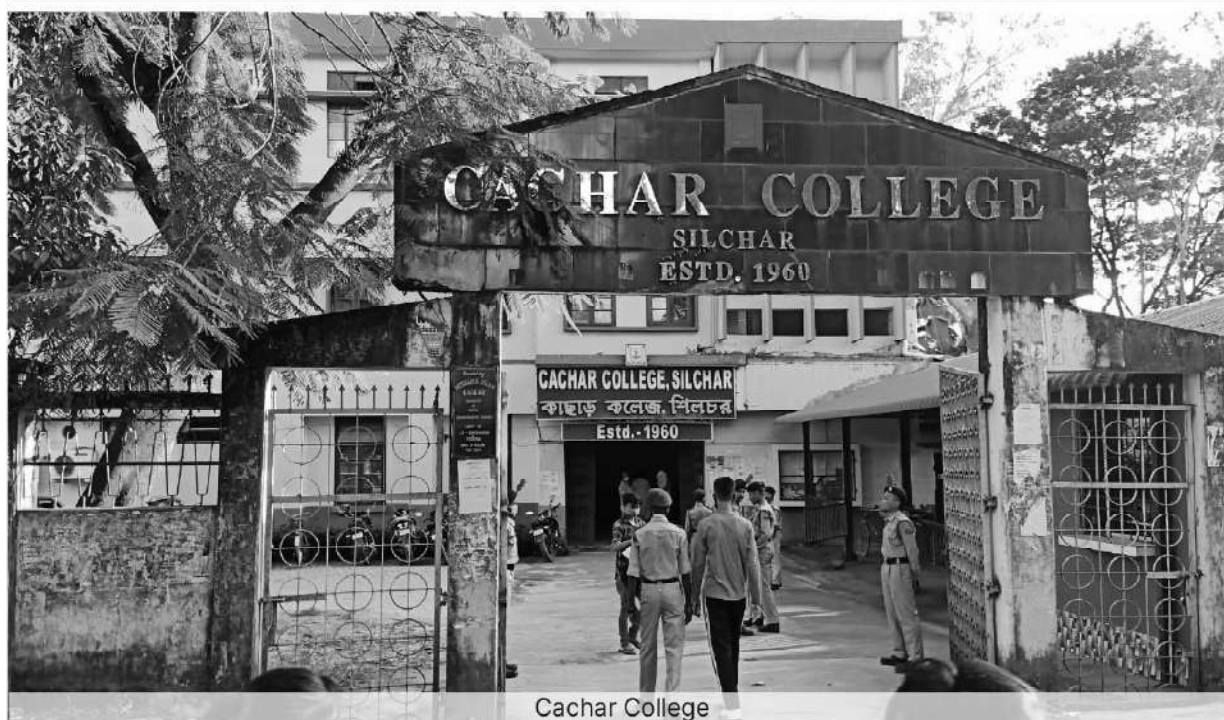
(Source: Inspector of Schools, Higher education)

Table 186 Government and private educational institute

Sl. No.	Government Educational institute	Private Educational institute
1	Assam University	Ramanuj Gupta junior college
2	A.K Chanda law college	Hamanginee Junior college
3	Teachers training college	Surendra memorial junior college
4	Women's college	R.R Memorial school and junior college
5	Guru Charan college	Silchar collegiate School
6	Cachar college	Holly Cross school
7	Silchar polytechnic college	Ramanuj Gupta School
8	Kendriya vidhyalaya Silchar	Tiny tots Home
9	Narshing high school	Muktashree high School
10	Normal training school	North eastern H.S school
11	Govt. Girls H.S school	Kidzee nursery School
12	Govt. Boys H.S school	Pranabananda Vidhyamandir
13	D.N.N.K school	South point High school
14	Adhar Chand H.S school	Netaji memorial institute
15	Silchar Medical college & Hospital	Oriental High school
16	-	Maharshi Vidhyamandir
17	-	Barak valley Academy

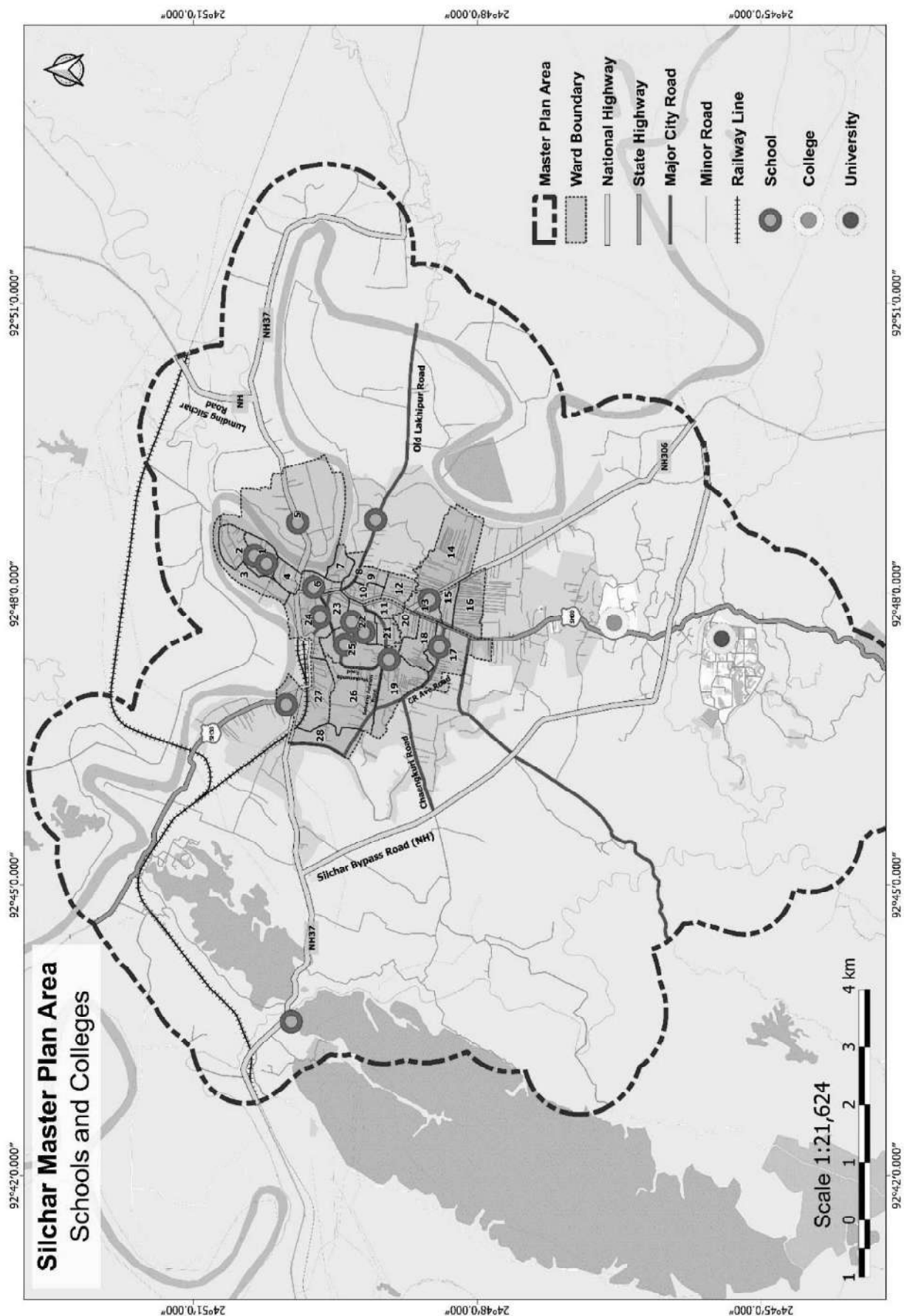
In order to provide adequate educational facilities and infrastructure all through the planning area, it can be proposed as setting up these facilities on a hierarchical basis i.e. at City Level (Planning Area), at Planning Unit Level, at Neighborhood Level and lastly at Residential Area level.

For instance, higher order facilities like college, integrated schools, school for handicapped are to be provided at the master plane level while facilities like Nursery and primary schools are to be provided at the Neighborhood level.



Cachar College





7.2.1.3 Educational Facility Demand Projection

Table 187 Demand-Supply Gap Assessment of Educational Facilities: School Level

Existing Scenario					Short Term			Medium Term			Long Term			LAND REQUIREMENT AS PER FUTURE NEED					
Sl. No.	Particular	Indicator Unit (number)	Current Level (2011)	Current Gap	Desired Level as per URDPFI guideline	2021		2031		2045		Area Requir e (Ha)	Short Term		Medium Term		Long Term		
						Deman d	Gap	Deman d	Gap	Deman d	Gap		Ga p	Total Area Requir e (Ha)	Gap	Total Area Requ ire (Ha)	Ga p	Total Area Requir e (Ha)	
1.	Population	-	471709			559588		657796		806933									
2.	School	-																	
		Pre-Primary, Nursery	80	108	2500	224	116	263	39	323	60	0.08 ha	116	9.26	39	3.14	60	4.77	
		Primary School (Class I - V)	13	81	5000	112	31	132	20	161	30	0.40 Ha	31	12.36	20	7.85	30	11.93	
		Senior Secondary (VI - XII)	31	32	7500	75	43	88	13	108	20	1.80 Ha	43	76.70	13	23.59	20	35.79	
		Integrated School without hostel facility (I - XII)		5	100000	6	1	7	1	8	1	3.50 Ha	1	3.08	1	3.5	1	3.5	
		Integrated School with hostel facility (I - XII)		5	100000	6	1	7	1	8	1	3.90 Ha	1	3.9	1	3.9	1	3.9	
		School for physically challenged	-	1	450000	1	0	1	0	2	0	0.70 Ha	0	0	0	0	0	0	
		School for Mentally channelled	-	0	1000000	1	0	1	0	1	0	0.20 Ha	0	0	0	0	0	0	

Table 188 Demand-Supply Gap Assessment of Educational Facilities: College level

Existing Scenario					LAND REQUIREMENT AS PER FUTURE NEED													
Sl. No.	Particular	Indicator Unit (number)	Current Level (2011)	Current Gap	Desired Level as per URDPFI guideline	Short Term		Medium Term		Long Term		Area Require (Ha)	Short Term		Medium Term		Long Term	
						Demand	Gap	Demand	Gap	Demand	Gap		2021	Gap	Total Area Require (Ha)	2031	Gap	Total Area Require (Ha)
1.	Population		471709			559588		657796		806933								
2.	Collage																	
		College	9	0	125000	4	0	5	0	6	1	5.00 Ha	0	00	0	00	1	5.00
		University Campus	1	3	125000	4	1	5	1	6	1	10.00 to 60.00 Ha	1	60.0	1	60.0	1	60
		ITI's/Vocational Training	-	5	100000	6	1	7	1	8	1	4.00 Ha	1	4.00	1	4.00	1	4.00
		Polytechnic	-	0	1000000	1	0	1	0	1	0	4.00 Ha	0	0.0	0	00	0	00
		Engineering College	-1	4	100000	6	2	7	1	8	1	6.00 Ha	1	6.00	1	6.00	1	6.00
		Medical College	-1	40	100000	6	2	7	1	8	1	15.00 Ha	2	30	1	15.00	1	15.00
		Other Professional Colleges	-	0	1000000	1	0	1	0	1	0	2.00 Ha	0	0.0	0	0.00	0	0.00
		Nursing		0	1000000	1	0	1	0	1	0	2.00 Ha	0	0.0	0	0.00	0	0.00

7.2.1.4 Summary of Educational Facilities Requirement

The demand of various Educational Facilities for the year 2045 is mentioned below in the table 189. The calculations are done based on URDPFI Guidelines.

Table 189 Demand of Educational Facilities & Land Requirement for 2045

Sl. No.	Particular	Demand in 2045	Land required in 2045 (Ha)
1	Pre-Primary, Nursery School	60	4.7
2	Primary School (Class I - V)	30	11.9
3	Senior Secondary School (VI - XII)	20	35.79
4	Integrated School without hostel facility (I - XII)	1	3.5
5	Integrated School with hostel facility (I - XII)	1	3.9
6	School for physically challenged	0	0
7	College	1	5.00
8	University Campus	1	60
9	ITIs/Vocational Training	1	4.00
10	Polytechnic	0	00
11	Engineering College	1	6.00
12	Medical College	1	15.00
13	Other Professional Colleges	0	0.00
14	Nursing and Paramedical Institute	0	0.00

(Source: Compiled by Consultant)

Based on the area requirement for each unit, land requirement for the above mentioned educational facilities is worked out. There will be a need of 115.68 Ha. of land for the above mentioned educational facilities.

7.2.1.5 Proposed Strategies

- As the process of educational department recruitment should be consolidate to make sure only highly skilled teachers are recruited.
- More infrastructural facilities like public library, laboratory, and computers should be provided to schools to enhance the pupil's learning.
- There is a need to set up more schools in villages and out growths of the planning area to improve the people's access to educational facilities.
- Welfare for the differently abled children should be given due emphasis by setting up special learning schools for them.
- Special emphasis should be laid on technical and skill based vocational education.
- More jobs oriented vocational courses should be introduced by utilizing the existing infrastructure facilities of polytechnic institutions.
- Keeping in view, the influence zone of Silchar, it is suggested that more emphasis should be laid on professional education, thus more number of professional institutes are proposed for future development.
- Looking into the potential of area, Knowledge District has been proposed in region.

7.2.2 HEALTH

The existing health facilities in Silchar include primary health centre, government and private hospitals, eye hospital, veterinary hospital, national polio surveillance centre and nursing homes. These facilities have been set up by both public and private sector organisations, although, the key medical facilities in the area are provided by private sector.

7.2.2.1 Current Scenario

Table 190 Existing Health Facilities of Silchar Master Plan Area

Sl. No.	Health Facilities in PPA	Number (as per Census 2011)
1	Primary Health Centre	8
2	First Referral Units	-
3	Community Health Centres	-
4	Sub-Centres	-
5	Clinic/Poly Clinic	-
6	Nursing Home	-
7	No. of Diagnostic Centres	-
8	Intermediate hospital	5
9	Multispecies hospital	1

(Source: Census of India 2011)



S.M. Dev Civil Hospital, Silchar

7.2.2.2 Health Facility Demand Projection

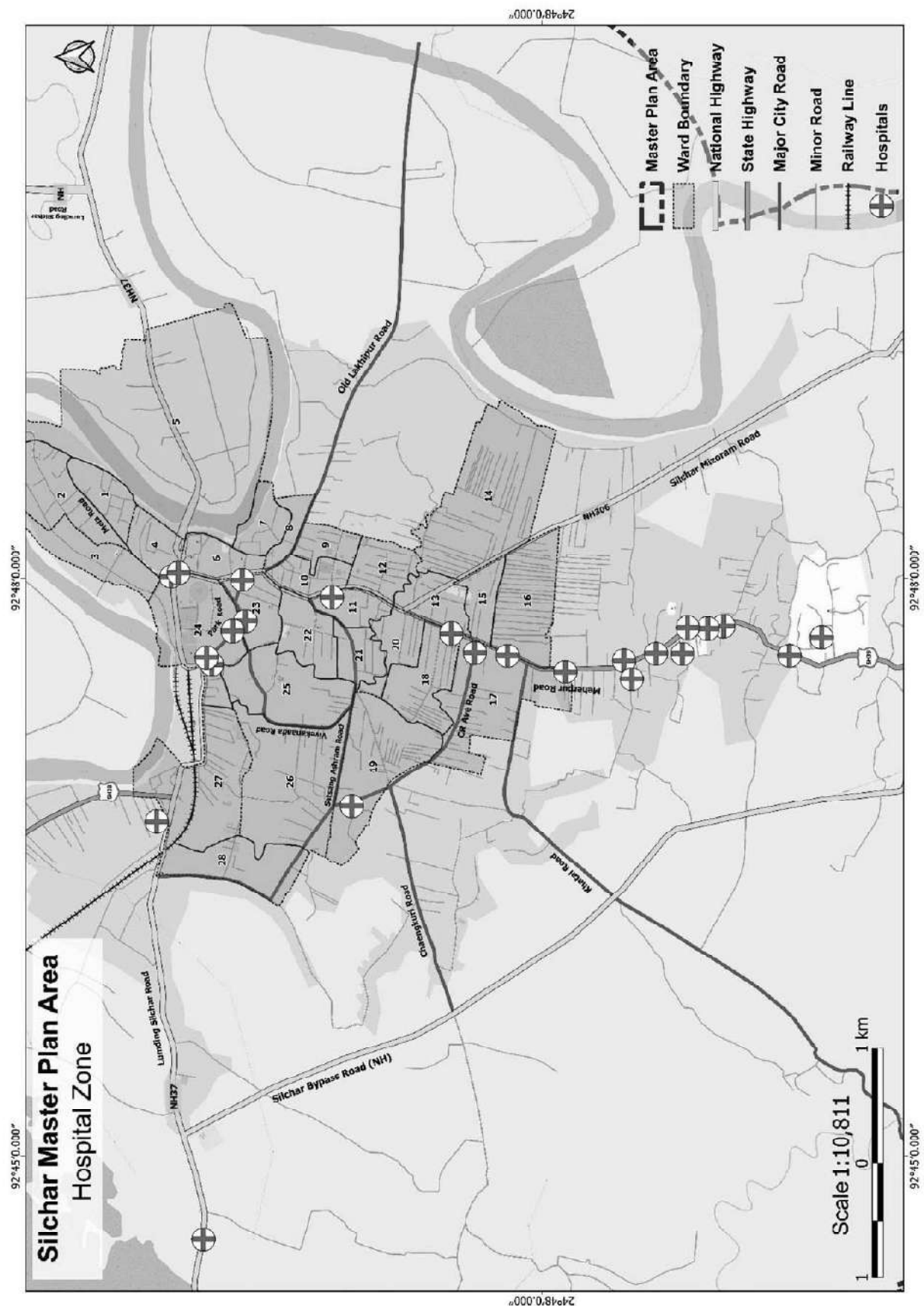


Figure 163 Spatial Distribution of Healthcare facilities in the Silchar Planning Area

Table 191 Demand-Supply Gap Assessment of Medical Services

[illegible]

7.2.2.3 Summary of Health Facilities Requirements

Table 192 Demand of Health Facilities & Land Requirement for 2045

Sr. No.	Particular	Demand in 2045
1.	Dispensary	10
2.	Nursing home, child welfare and maternity centre	3
3.	Polyclinic	1
4.	Intermediate Hospital (Category B)	1
5.	Intermediate Hospital (Category A)	1
6.	Multi-Specialty Hospital	1
7.	Specialty Hospital	1
8.	General Hospital	1
9.	Family Welfare Centre	3
10.	Diagnostic centre	3
11.	Veterinary Hospital for pets and animals	2
12.	Dispensary for pet animals and birds	0

(Source: Compiled by Consultant)

Based on the URDPFI Guidelines 2015, the demand of health facilities in 2045 for Silchar Planning Area is worked out. There will be a need of 1 General hospital, 05 Polyclinics, 10 Intermediate Hospitals, 5 Special Hospitals and 1 veterinary hospitals for pets and animals till 2045. This shall be spatially distributed in the planning area. Based on the area requirement for each unit, land requirement for the above-mentioned health facilities is worked out. There will be a need of 89.24 Ha. of land for the above-mentioned health facilities.

7.2.2.4 Proposed Strategies

Silchar Master Planning Area is having reputed medical institutes which provided best medical facilities and medical education. Some important measures that can be taken up by appropriate authority to augment and improve the Health care system and facilities in Silchar Planning area:

The rural health system has to be improve the medical services. Government agencies carrying out the planning and implementation of the initiatives in medical services have to be provided with enough funds to upgrade the existing medical infrastructure in the government hospitals and for modernization medical equipment's.

- It is also important to cater to needs and welfare of the elderly and differently-abled residents of the area. Thus, old Age Home-cum-Care Centre for Senior Citizens and Mentally Challenged should be appropriately set-up.
- Introduction of new technology like provision of multi specialty facilities and equipments etc. in the hospitals and primary health centers.
- There is requirement for training centers for nurses and paramedical staff like pathology, pharmacy may be started to train local and regional students.
- There is a need for the up-gradation of existing hospital, Clinics, Nursing Homes, etc in the planning area especially those publically owned.
- Setting up of dispensaries in rural parts of the planning area which are currently absent.

7.2.3 OTHER SOCIAL INFRASTRUCTURAL FACILITIES REQUIREMENT

Other social infrastructure facilities like commercial centres; Socio-Cultural facilities, library, milk booths, LPG Go-downs, Police stations, Post Office, Fire stations, etc.; Recreational facilities like parks, Multi-Purpose Grounds, sports facilities, etc. are also essential for the balanced development of the planning area and improving the quality of life of the its residents.

7.2.3.1 Existing and Future assessment of social infrastructure facilities

Table 193 Existing and Future assessment of social infrastructure facilities

Category	Population served per unit	Area Requirement	Requirement	Existing	Future Requirement (2046)	Future Area Required
Anganwadi - Housing area/cluster	5000	200-300 sqm	94	-	67	20100
Community Room	5000	750 sqm	94	-	67	50250
Community hall, nagalkayavala, barat ghag/library	15000	2000 sqm	31	2	29	58,000 sqm
Music, dance and drama centre	1 lakh	1000 sqm	5	2	3	3,000 sqm
Meditation and spiritual Centre	1 lakh	5000 sqm	5	-	3	15000
Recreational Club	1 lakh	Max. 1000 sqm,	5	-	3	3000
Old age home	5 lakhs		1	-	1	
Religious Facilities						
At Neighbourhood /Housing cluster level	5000	400 sqm	94	-	94	37600
At sub city level in urban extension	10 lakhs	4.00 Ha	-	-	-	-
Other Facilities						
Orphanage/ Children's Centre one each	10 lakhs	Max. 1000 sqm,	-	-1	-	-
Care centre for physically /mentally challenged	10 lakhs	Max. 1000 sqm,	-	-	-	-
Working women – men hostel	10 lakhs	Max. 1000 sqm,	-	-1	-	-
Adult education centre	10 lakhs	Max. 1000 sqm,	-	-	-	-
Night Shelter	10 lakhs	Max. 1000 sqm,	-	-	-	-
Socio – Cultural centre/Exhibition cum fair ground	10 lakhs	15 Ha	-	-	-	-
Science Centre	10 lakhs	As per requirement	-	-	-	-
International Convention	City level	As per requirement	-	-	-	-

7.2.4 PARKS & OPEN SPACES

Table 194 Existing and future assessment of open spaces.

Category	Population served per unit	Area Requirement (Ha)	Requirement	Existing	Future Requirement (2045)	Future Required Area
Housing Area Park	5000	0.50 to 1.00	93	98	41	41 ha
Neighbourhood park	10000	1.20 to 2.00	46			
City Parks/ playgrounds/ maidan/exhibition grounds/ cultural gathering grounds	1 for every town					
Botanical Garden	1 for every town	10.00 to 20.00				
Recreational complex including zoo	1 for every settlement with tourist potential	10.00 to 12.00				

(Source: Compiled by Consultant)

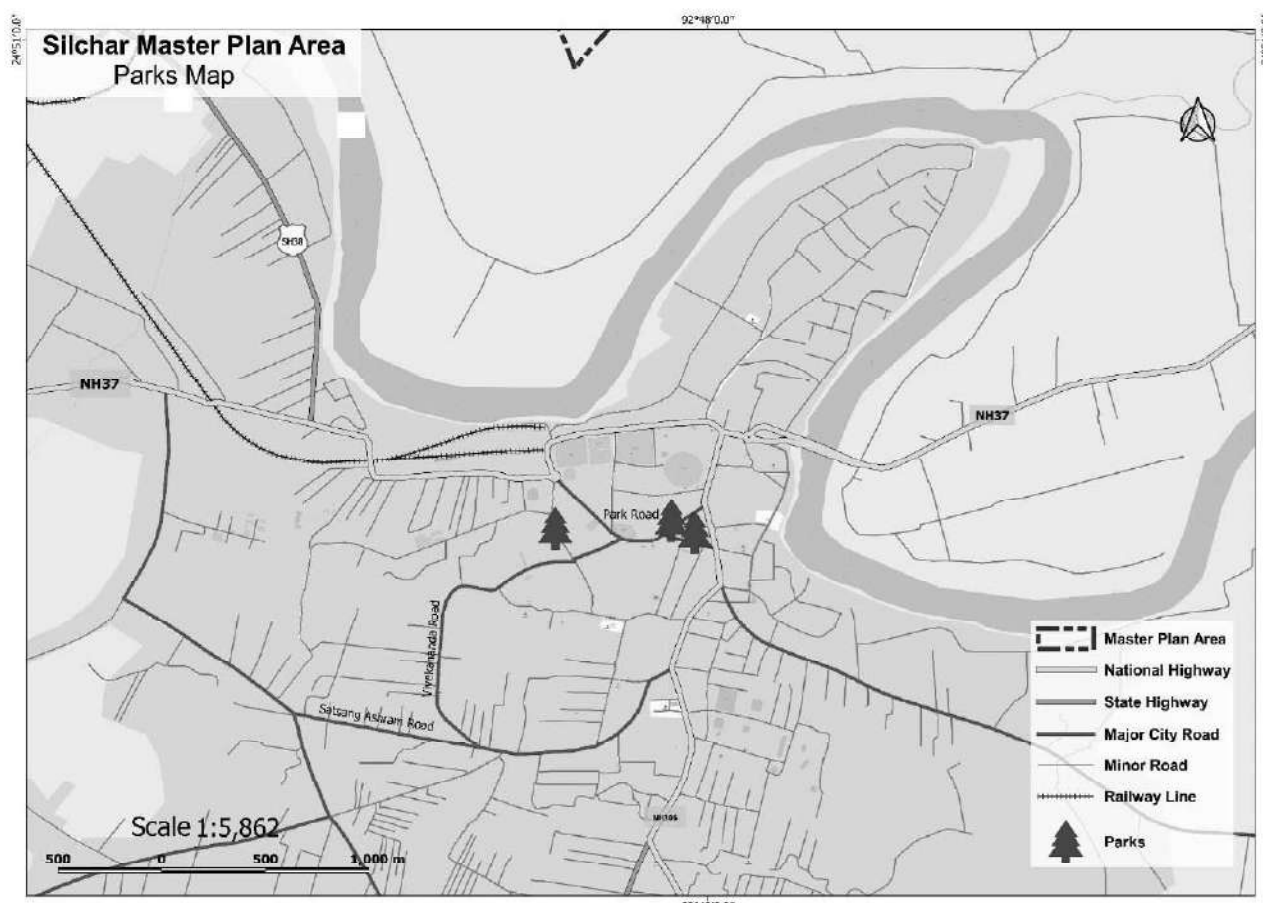
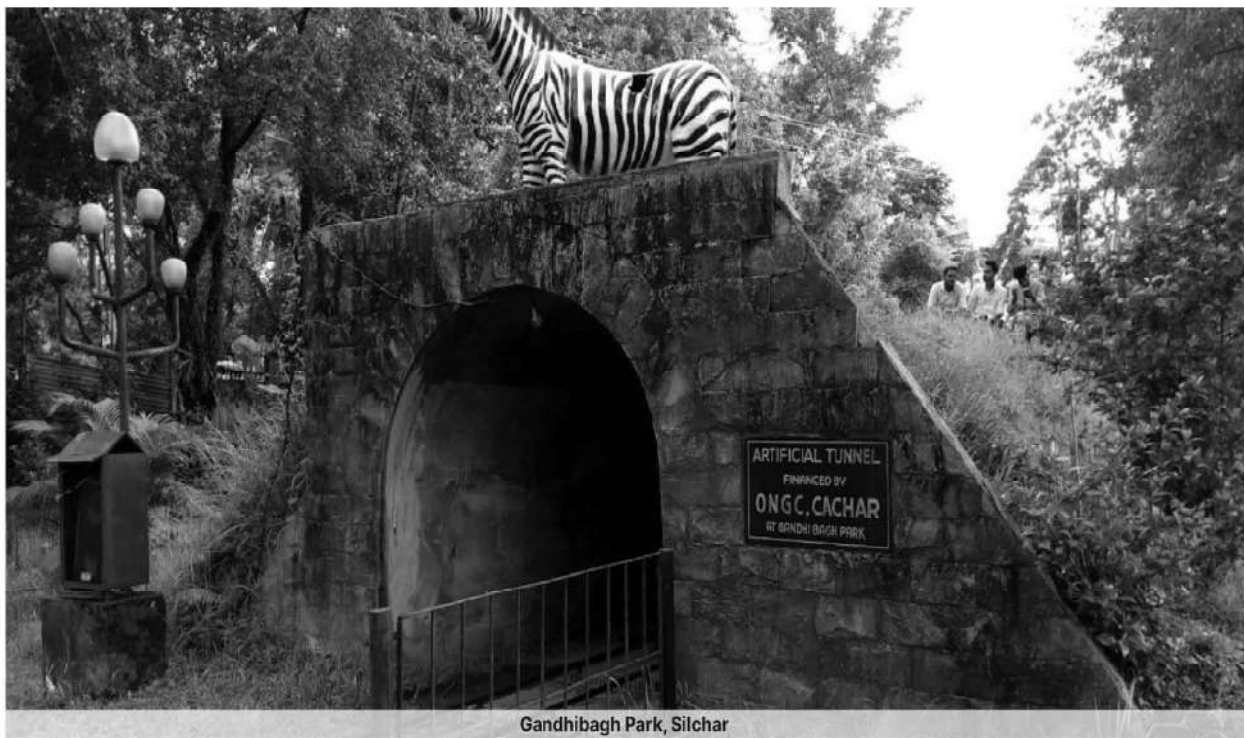


Figure 164 Parks spatial distribution Map



Gandhibagh Park, Silchar



Gandhibagh Park, Silchar

7.2.5 MULTI-PURPOSE GROUNDS AND SPORTS FACILITIES REQUIRED

Table 195 Existing and future assessment of multipurpose grounds and sports facilities

Category	Population served per unit	Area Requirement (Ha)	Requirement	Existing	Future Requirement (2045)	Future Required Area
Sub city level multipurpose ground	10 lakhs	8				
District level multipurpose ground	5 lakhs	4		1	1	4ha
Community level Multipurpose ground	1 lakh	2	5	0	3	6 ha
Residential unit play area	5,000	5000 sqm	137	7	130	65ha
Neighbourhood Play area	15,000	1.50 ha	31	0	22	33 ha
District Sports Centre	1 lakh	8.00 ha	5		3	24 ha
Divisional Sports Centre	10 lakhs	20.00 ha	0			

(Source: Compiled by Consultant)

7.2.6 COMMUNITY FACILITIES

7.2.6.1 Existing Communities and other Facilities

Table 196 Existing Communities Facilities

Sr. No.	Facilities	Numbers
1	Corporation Gardens	3
2	Community Hall	2
3	Swimming Pool	1
4	Corporation Playgrounds	7
5	Gymnasias	1
6	Corporation Stadium	1
7	Cinemas	3
8	Open Air Theatres	-
9	Zoo	-
10	Public libraries	2
11	Art Galleries	-
12	Museum	1 (Ongoing)
13	Other (specify)	
14	Fire Services	2 (Tarapur, Rangir)
	No. of Fire stations	2
	No. of fire tenders	-
	Personnel	22
15	Cremation/Burial Ground	5 (2H, 2C, 1M)
16	Petrol/Gas Station	18
17	Hotels and Eating Places	27

(Source: Compiled by Consultant)

7.2.6.2 Existing and Future assessment of Community facilities

Table 197 Existing and Future assessment of community facilities.

Category	Population served per unit	Area Requirement (Ha)	Requirement	Existing	Future Requirement (2045)	Future Required Area
Milk Booths	5000	0.015	94	-	67	1.00ha
LPG Godowns	50000	0.2	9	18	0	-
Police Station	90000	1.5	2	3	5	7.5ha
Police Post	40000	0.16	7	4	16	2.56ha
District Jail	1000000	10	0	-	-	-
Fire Station	200000	1	-	2	2	2ha
Sub Fire Station	within 3-4km radius	0.6	-	-	-	-
Disaster Management Centre	One in each administrative zone	1	-	-	-	-
Post Office	15000	0.6	31	-	22	13.2ha
Graveyard / Burial Ground	10000	1	47	5	80	80ha

(Source: Compiled by Consultant)

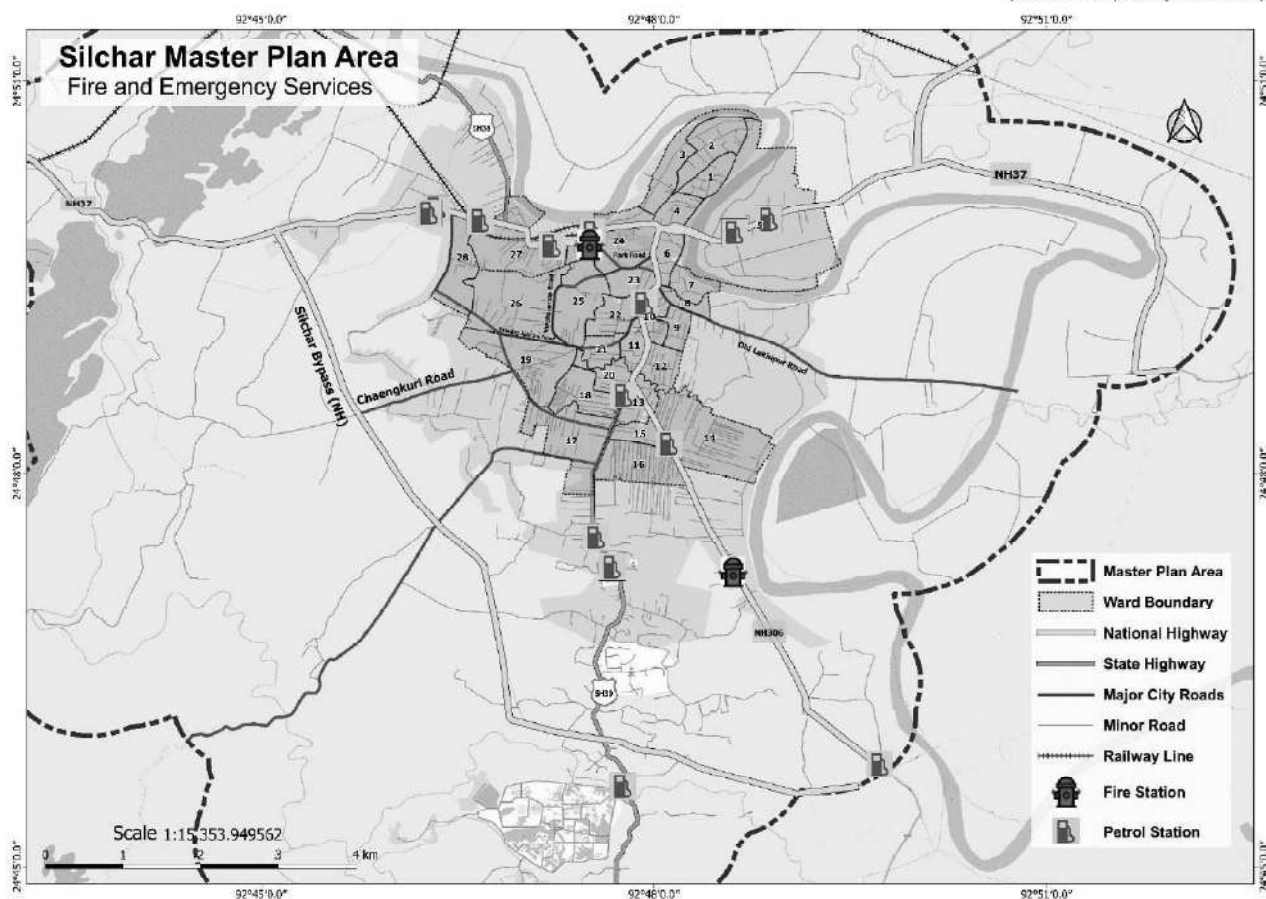


Figure 165 Community Facilities spatial distribution Map

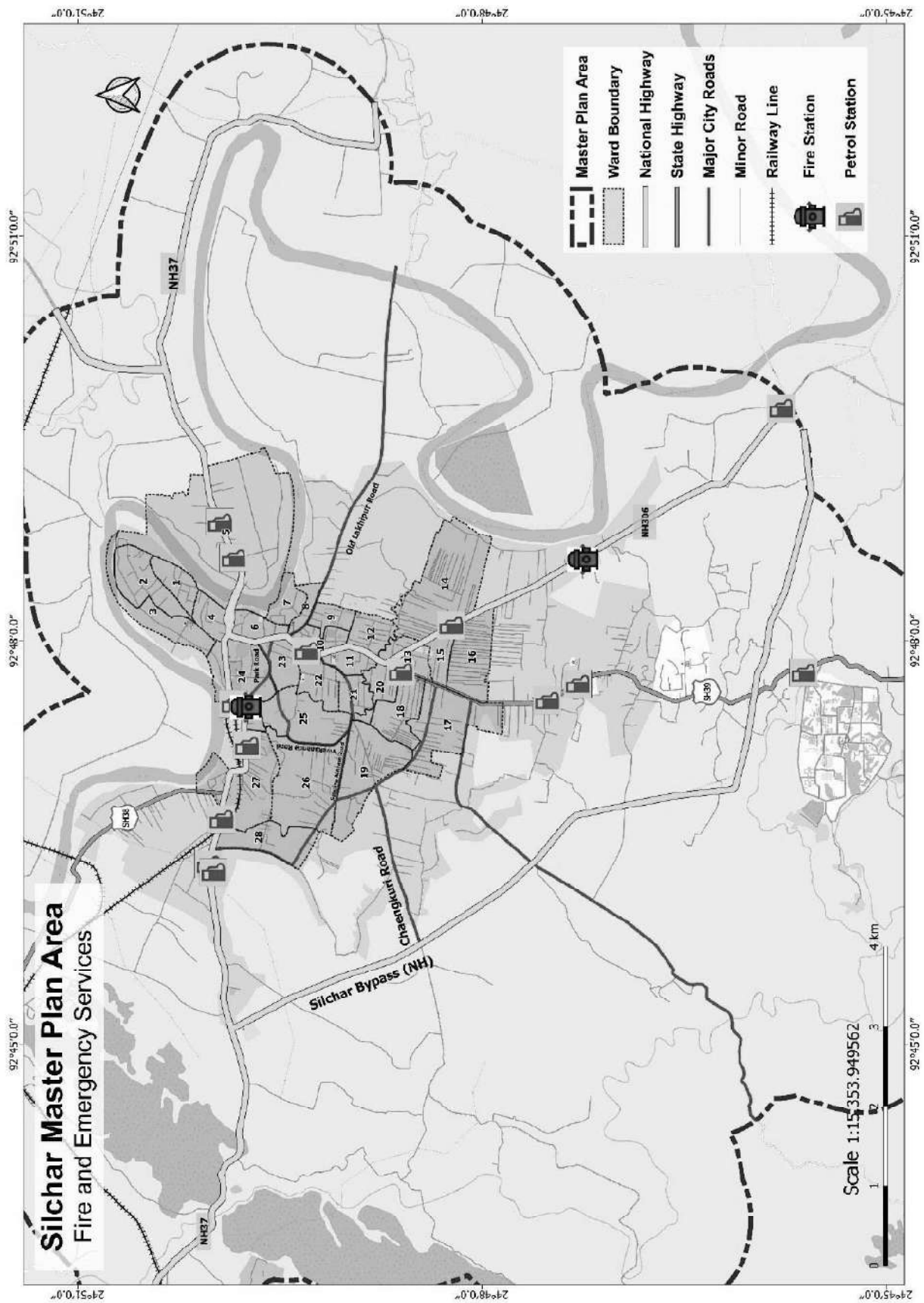


Figure 166 police station and outposts

7.2.7 COMMERCIAL FACILITIES

7.2.7.1 Existing Commercial Facilities

Table 198 Existing Commercial Facilities

Year	Hotel	Restaurant	Wholesale	Retail shop
(up to 2019)	132	156		16000

(Source: Silchar Municipality)

7.2.7.2 Existing and Future assessment of Community facilities

Table 199 Existing and future assessment of commercial facilities.

Category	Population served per unit	Area Requirement (Ha)	Requirement	Existing	Future Requirement (2045)	Future Required Area
Convenience Shopping	5000	0.15	94	-	67	10.05ha
Local shopping including service centre	15000	0.46	31	-	23	10.5ha
Community centre with service centre	100000	5	5	-	3	15ha
District centre	500000	1	1	-	1	1ha

(Source: Compiled by Consultant)



Imperial Mall, Silchar

8 CULTURE AND HERITAGE

8.1 THE CULTURAL OF SILCHAR

Silchar is located on the Barak River in the southern Assam. It is also the gateway to other Northeastern states like Manipur, Mizoram, and Tripura. The town sees a large settlement of traders from distant parts of India every year. The town lies in the Surma valley region, and it is an extremely picturesque destination.

The place and its culture are unique to Silchar. Most of the population is Bengali who speaks the Sylheti dialect of Bengali. The rest of the population mostly comprises of Marwaris, Bishnupriya Manipuris, Manipuri-Meiteis, and tribal-like Nagas. The local delicacies include the Shutki (the dried fish), shidal chutney, 'chunga-r peetha' etc.

In the 1850s, British tea planters re-discovered the game of polo in Manipur on the Burmese border with India. In fact, the first polo club of the world was formed in Silchar and the first competitive modern polo was held here. The commemorative inscription for this achievement can still be seen behind the district library of Silchar.

While the hill areas of the Kachari kingdom i.e. Dima Hasao, had a Dimasa stronghold, the plain areas i.e. present day Cachar had Bengalis constituting the majority. While Bengalis had been inhabiting Cachar before the Koch rule, the Dimasa kings encouraged increased migration of Bengalis from nearby areas as priests, cultivators, and ministers at court. Eventually, the formal conversion of Dimasa kings into Hinduism was carried out under Bengali Bhramans when Raja Krishna Chandra and Raja Govinda Chandra performed the Hiranigarbha ceremony in 1790.

The kings in turn were great patrons of Bengali literature. Bengali was the court language of the Kachari kings, translation of Sanskrit texts into Bengali was carried out, and the kings themselves composed prose and poetry in Bengali. In fact some of the only surviving written examples of the Bengali tradition in later 18th and early 19th century Cachar are the 27 letters written by Raja Krishna Chandra and Raja Gobinda Chandra to the East India company.





8.1.1 SOCIO-CULTURE IN SILCHAR

Silchar is the second largest city and the district capital of Cachar district of Assam. The place and its culture are unique to Silchar. Most of the population is Bengali who speaks the Sylheti dialect of Bengali. The another major tribe is Dimasa, which descended from Dimasa Kachari kingdom. The rest of the population mostly comprises of Marwaris, Bishnupriya Manipuris, Manipuri-Meiteis, and tribal-like Dimasa Kachari and Nagas. The local delicacies include the Shutki (the dried fish), shidal chutney, 'chunga-r peetha' etc.



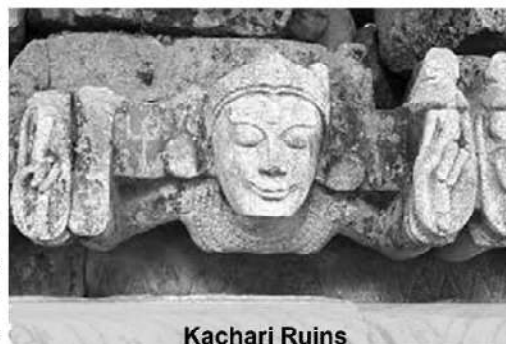
Pooja Celebration by Locals

In the 1850s, British tea planters re-discovered the game of polo in Manipur on the Burmese border with India. In fact, the first polo club of the world was formed in Silchar and the first competitive modern polo was held here. The commemorative inscription for this achievement can still be seen behind the district library of Silchar.

8.1.2 THE DIMASA KACHARI TRIBE

The the Dimasas are known to be part of the Bodo group, but in the history of Assam they are mostly referred to as Kachari. The Kacharis belong to the Indo-Mongoloid peoples and the Tibeto-Burmese linguistic family. The term 'Dimasa' means 'children of the big river' in the Dimasa language, 'di' means river, 'ma' means big and 'sa' means children.

The Dimasa language is known as 'Grao-Dima'. There is no official script, but Bengali, Assamese and English scripts are normally used. According to the 2001 census report, the total population of Grao-Dima speaking people is 1,10,957. Large Dimasa Kachari settlements are in Dima Hasao, Karbi Anglong, Nowgong and Cachar districts of Assam. A small number of Dimasa people have settled in Nagaland too. This tribe is basically belongs to south Assam and Nagaland. A popular legend among the Dimasa people says that their ancestors were living at the confluence of the rivers



Kachari Ruins

The ruins of the Dimasa kingdom in Dimapur show their fondness for and fine taste in art and culture. Advanced architecture and city planning are indications of the refinement of the rulers. Dimapur was surrounded on three sides by a brick wall of the aggregate length of nearly two miles, while the fourth or southern side was bounded by the Dhansiri River. On the eastern side, was a fine solid brick gateway, with a pointed arch and stones pierced to receive the hinges of double heavy doors.

Though Dimasa society is one of the patriarchal communities of India, yet it has prominent matriarchal figures. Males and females have equal status.

8.1.2.1 Occupation of Dimasa Community

Agriculture is the main source of livelihood in Dimasa society. In hilly areas they still practice jhum (slash-and-burn) cultivation. Along with rice and maize, they also cultivate castor, sesame, cotton, chilly, pumpkin, gourd, ginger, brinjal, mustard, pineapple and orange. In the plains areas, they follow the same farming practices as non-tribal people. Rice is the staple food of the Dimasa. Among vegetables, banana flowers, bottle gourd, pumpkin, squash, bamboo shoot, tapioca and wild herbs are common in their daily diet. Khari, a type of alkali, produced domestically, is one of the main ingredients of their cuisine. Khari with kalai daal is a

common food item. Different varieties of fish and dried fish, namely, nagraing and naplam are their favourite food. Eri pupa is also a delicacy. Among meat, they usually take chicken, mutton and pork. Zu or Judima, a type of rice beer is their favourite beverage. Chewing of betel nut and betel leaf is very common among them.

The handloom weaving is a women-centred craft in Dimasa society. It is a popular saying among the Dimasa that their women are born experts in weaving. Agriculture, food and weaving are so closely connected in their society and culture that one is not complete without the other. Cultivating castor plants to rear the eri cocoon (the eri pupa eats the castor leaf) and developing it into fibre, reeling and spinning the fibre into yarn, and finally weaving the cloth is an age-old tradition of Dimasa Kacharis. The eri cloths woven by Dimasa women are much finer in quality than those woven in other parts of Assam. Dimasa textile motifs take inspiration from their surroundings, and include simplified forms of flora and fauna. The motifs are introduced in extra



Dimasa Handloom Weaving

weft technique on plain-weave cloth, with colourful yarns—mainly orange, green, yellow, blue, red and black.

Dimasa women weave cloths for domestic use and ceremonial functions only. Weaving is not generally done for commercial purposes or profit; but sometimes, after fulfilling domestic needs, they sell the spare fabrics. This way, they generate an additional income.

8.1.3 FESTIVALS AND FOLK PRACTISES

Their main festival, Bishu, is in January, when they celebrate the winter harvest with religious rituals, traditional dances, music and cuisine. They wear traditional attire, hand-woven by the Dimasa women, and it is a custom to present hand-woven cloths to relatives and friends on such occasions. Busu is an important festival celebrated by the Dimasa with the celebration of great pomp and splendour. It is celebrated after completion of harvest. The word Busu gives the meaning such as Brai-Sibrai is a supreme God in Dimasa society. So, in this way, the entire harvesting new paddy is offered first to the Brai Shivarai madai for peace of the human kind is called Busu. Phangsla, an artistically designed gate, is erected at the village entrance for the Bishu festival. Busu Dima has a three kind namely Surem Busu observe for three or five days, Hangseu Manaoba Busu is observed for seven days and Jidab Busu is for only one day. Gajaibao is selected as a head of the festival. He is in charge of the festival. Meats of animals and birds killed are consumed in a communal feast on the very day. Busu is followed by singing accompanied by the rhythm of Kharams (drums), Muri, the wooden buggle continues first to third days without stop. Man and woman, Boys and Girls and others with their traditional dress spends whole night by dancing in the festival. In the afternoon local games like long jump, high jump, stone throw is organised in front of Nodrang in last day. Busu Garba is conducted by the Khunang with elders. Any chief guest, invited guest has to be welcome by playing the Muri(fife) and Kharam(drums) in any occasion in Dimasa society.

8.1.3.1 Bushu Jidap

Busu Jidap is generally observed for one to three days. It is celebrated under the guidance of the leadership of the Khunang or Gaonbura. The first day is called mi-staiba meaning slaughtering day of animals for feast. The animal is slaughtered in the morning and in the afternoon they held a community feast called Khalaima khamba in the house of Khunang. When the sun goes down the competition called Baiba Bdailaiba consisting of singing, dancing and playing musical instruments of Muree are held in the courtyard of the bachelor's traditional house called Nohdrang.

8.1.3.2 Surem Baino

It is generally celebrated for five days. Surem Baino, unlike the Busu Jidap, is celebrated under the guidance of Gajaibao not of the Khunang (Village headman). When a village is supposed to observe the Surem Baino, they would have to elect or select the Gajaibao or leader or guardian for it long before the celebration. The Surem celebration is then undertaken in the courtyard of Gajaibao. The function like dancing, singing is also held in the compound of Gajaibaos whereas in the Jidap they observe in the Nodrang. These are the differences between Jidap and Surem Baino.



Dimasa Kachari Dance

8.1.3.3 Dance and Music

The dance forms of the Dimasa Kachari are complex in character. They are strictly dependent on instrumental music. No songs are used. Kharam (drum) follows the rhythm of the Muri (fife) and so also the dancers. Though one may find the music from Muri to be monotonous, there are variations with noticeable microtones for different dance forms. That is why young men practice dancing at Nodrang during leisure hours and the village children follow the rhythm and stepping at a distance from an early age.

Any Dimasa dance is called Baidima (Bai-means dance, Dima-means Dimasa)

Different kinds of Dimasa dances are-Baidima (Hasao), Baidijuwa, Baidembra, Baimaijai (It means a cultural performance with stone sieve once a time during Dimapur reign, so called Baimaijai. Now-a-days its unable to perform with stone sieve. So cultural performer conducts with plate or Dish during Festival time.), Baijabah (war dance), Hadaobani, Jaubani, Jauphinbani, Ren-gnibani, Baichergi, Khunlubani, Dainselaibani, Khamauthaikhim Khaubani, Nanabairibani, Burunjala Khalaibani, Homau daobani, Hakhori Jaobani, Rong-jaobani, Dausimaikhabani, Dauyungjang, Nowaijang dainlaibani, Nah-rimbani, Rogidaw Bihimaiyadao, Maijaobani, Maishubani, Rishibani, Mishai Bonthai Jibani, Madaikhilimbani and others.

8.2 SPRITUAL PLACES

8.2.1 ISKON TEMPLE

Located at Ambikapatty area of Silchar, ISKCON is one of the most important and well-built temples of Silchar. As the name suggests, the temple was built and is maintained by International Society for Krishna Consciousness and is dedicated to Lord Krishna. The temple has idols of Gaudiya Vaishnava (Chaitanya Mahaprabhu) along with the idols of Krishna and Radha. Standing tall at close to 50 ft the temple overlooks the locality and is famous for its architecture. The temple draws huge crowds during the festivals of Janmasthanmi and Durga Puja every year where thousands of people are served the Holy Prasad at the temple premises. The monks at the temple are also involved in much charitable work for the poor in and around the Silchar. The delicious vegetarian meal that is served every day for the devotees is a significant attraction with the tourists visiting this temple.



Iskon Temple



Sri Sri Gopal Jiu Aakhra

8.2.2 SRI SRI GOPAL JIU AAKHRA

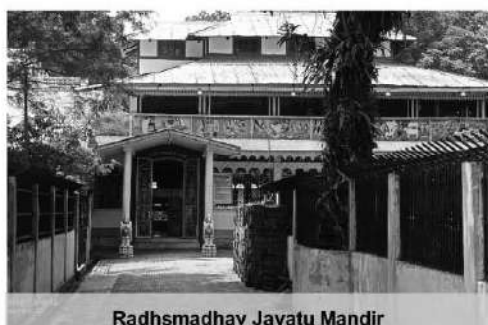
The Gopal Jiu Mandir, was oldest and most famous temple in Silchar. It is Krishna (Lord Vishnu incarnation) temple. On every holy occasion specially on Janmashtmi. The temple is near to Iskon temple, the whole periphery is flooded with Lord Krishna Devotees. This spritual center have involve in many services in daily practices.

8.2.3 SHAMSHAN KALI MANDIR

Shamshan Kali Bari Temple is situated in near in Ambicapatty road, Silchar. The Temple is devoted to Goddess Kali, where lots of hindu devotees come especially during Navratri. The temple is very significant and important among the locals. The temple has quite large periphery with garden and sitting place. The cremation is also inside the temple where people practice death rituals.



Shamshan Kali Mnadir



Radhsmadhav Jayatu Mandir

8.2.4 RADHAMADHAV JAYATU MANDIR

This ancient temple was established in the year of 1836, situated in Bilpar area of Silchar. This temple is known for Lord Krishna and the rituals practices since ancient times. The temple holds the heritage old structure with the carvings and painting that signifies the culture of that ancient time.

8.2.5 SATSUNG VIHAR

With the beautiful architecture, this temple was established in 1978. It is situated at Ashram road. The temple is also a place for Kirtan and Satsung take place. The devotees here come and perform many rituals including dance and singing. During febraury month, a fair (mela) used to held in the occasion for lord Anukul where thousands of devotees come and many shops and other exhibitions used to take place.



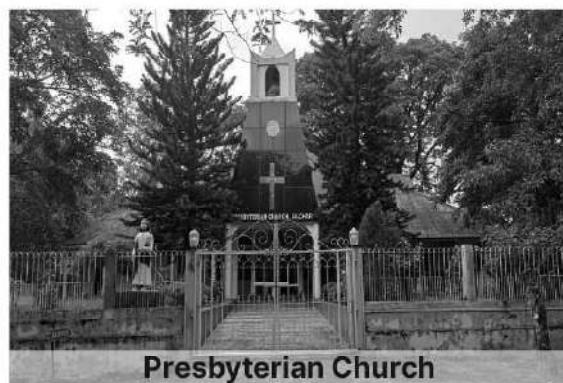
Satsung Vihar



Ramkrishna Mission

8.2.6 RAMKRISHNA MISSION

This 9th branch of Ramkrishna mission was established in 1924. This trust is situated in Jhalupara, Silchar. The school teaching till elementary section for tribal student and many social work are done by this trust. All the pooja during navratri and other holy festivals and rituals are performed here.



Presbyterian Church

8.2.7 PRESBYTERIAN CHURCH

This church was established in 1851, during British colonial period. It is the major church in Silchar and the church committee organize huge festival during the time of Christmas.

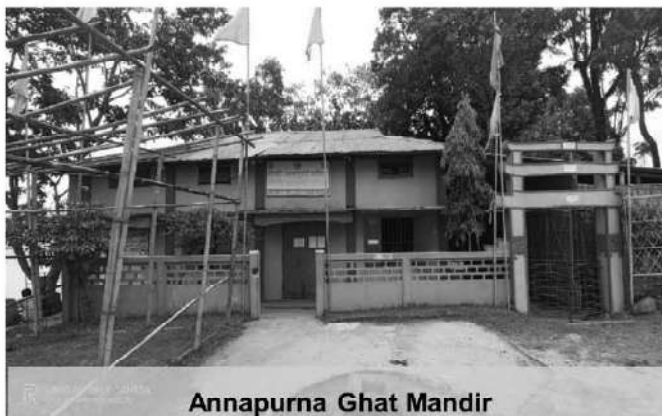


8.2.8 BORO MAZJID

This holy mosque established in 1884, situated in Goplaganj. This mosque is the biggest mosque for Muslim faith in Silchar. It has so beautiful architecture from inside as well as from outside. Many devotees gathered in their prayer time as well as during their festival. The mosque used to decorate during all their festival time.

8.2.9 ANNAPURNA GHAT MANDIR

Annapurna Ghat Mandir situated at Tarapur, near Silchar railway station. At the bank of Barak river this shrine is very old and reestablished again in 1933 Goddess Annapurna along with Lord Shiva and Ganesha is worshipped here. Many navratri and other Kali puja, Durga puja used to celebrate and many other life rituals are also performed. During Mahaalya, male devotees take bath in the river and during Kali puja devotees float lamps in the river to show gratitude to their ancestors.

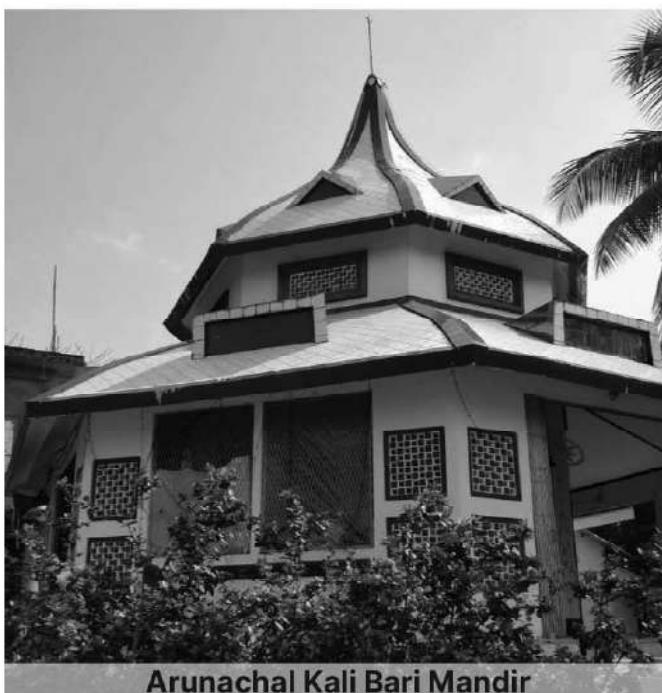


8.2.10 RAKKHA KALI MAA MANDIR

The one and only Rakkha Kali Mandir in the whole Barak valley, situated in the bank of Barak river. Many ritual in the gratitude of Kali performed here. Along with Goddess Kali , Lord Shiva, and Loknath Hanuman is worshipped here.

8.2.11 ARUNACHAL KALI BARI MANDIR

Arunachal Kali Bari Mandir is a holy shrine which is located in Ramnagar, Silchar. It is located at a distance of around 5. 1 kms from the city centre of Silchar. Arunachal Kali Bari Mandir is a beautiful temple. The residing diety of this temple is goddess Kali. There is a small red coloured gate which leads to this temple. The building is of vibrant red colour which attracts the passers by. There are many holy trees present inside the temple premise, which are also worshipped by the devotees. There is a small market which is very near the temple, therefore this temple witness a little crowd. It remains a little crowded on special hindu occassions.



8.3 HERITAGE

Conservation of buildings, artefacts, structures, areas and precincts of Historic, aesthetic, architectural, cultural significance (Heritage buildings and heritage precincts) will fall under the norms prescribed by the ASI, would need redevelopment and redesign without hampering the fabric of area. Following are the tangible and intangible identified heritage site which fall under the National, Regional and Local context levels.

8.3.1 INTRODUCTION

Silchar is the headquarters of the Cachar district of the state of Assam, India. It earned the moniker "Island of Peace" from Indira Gandhi, the then Prime Minister of India. Silchar is the site of the world's first polo club and the first competitive polo match.

There is no mention of any place called 'Silchar' before the annexation of Cachar. Its constituent areas such as Tarapur, Ambikapur, Kanakpur, and Rongpur have been mentioned as villages under Gobinda Chandra, but not 'Silchar'. The earliest mention of Silchar was in 1835 in a report by R.B. Pamberton, and since then it was mentioned in British official documents. Silchar was founded as the administrative headquarters of Cachar around the Janiganj-Sadarghat area of the town. The city has major history which create its heritage in present time.

8.3.2 HERITAGE IN SILCHAR

8.3.2.1 *Silchar Circuit House*

Located centrally, Silchar Circuit House is the 114 year old building which was built in 1906-1907. It was established by then Deputy commissioner F.C. French at the time of British Colonial Rule. The building is still functioning as Circuit house and representing British Architecture. The building is well maintained with proper renovation and restoration to signifies its Heritage value.



8.3.2.2 *Cachar District Court, Silchar*

The oldest court established under the colonial regime. Before independence, the Judicial proceedings were carried on by the Deputy Commissioner who used to grant pleadership after an informal test of respectability and ability. The establishment of District Judge and Chief Judicial Magistrate comprises of 15 Courts manned by Judicial Officers of different grades. The Court of Cachar Judiciary were spread in 4 buildings among which are 1 two-storied building, 2 Assam Type houses and 2 old buildings which before independence were used by Britishers to keep their arms and ammunations. All these buildings still represents British era workmenships and Architectural values. The buildings are well maintained by District Government and needs to be improved with proper retrofitting and renovations.





8.3.2.3 Kachari Fort

The Cachar district in Assam has a very important historical connection as it used to be the capital of the Cachar Kings during the medieval times. One such famous historical Fort here is the Khaspur Fort which is considered to be one of the magnificent forts. It reflects the rich cultural heritage of the ancient Kachari Kingdom era through the fine quality of work done by the engineers of that time. The fort is covered on all sides by the lush greenery. The palace of the Kachari kings can be found at their last capital Khaspur, about 10 kilometers from Silchar. Kachar empire was considered as a powerful kingdom in medieval Assam. The rulers belonged to the greater Bodo-Kachari ethnic group. Ruins and archaeological remains of the Kachari kingdom still exist in Khaspur. Khaspur was originally a part of the Tripura kingdom but was taken over by Chilarai in the 16th century and was ruled by Kamalnarayana, the brother of Chilarai.

8.3.2.3 Indian Post Office

In 1852, The head post office got established in Silchar. Post office is located at Tarapur area of core city centre. Traditionally the primary function of Silchar post office was collection, processing, transmission and delivery of mails but as of today, a Post Office offers many other vital services in addition to its traditional services. The additional services provided by a Dak Ghar include – Mail Services, Financial Services, Retail Services and Premium Services.



8.3.2.4 Normal School Building

In the middle of the beautiful lush green area at Tarapur point, stands one of the most oldest and prestigious institute of Barak Valley 'Normal School, Silchar'. Established in the year 1907, Normal school has evolved leaps and bounds. This teacher training institute has always been one of the recognizable establishments not only in Barak Valley but in the entire Assam too. It is a century old institution with many laurels and achievements.

From some of the testimonials studied, it has been analysed that the then, Chief Commissioner of Assam, Sir Benfield Fuller felt the need of an institution which requires the grooming of teachers in the land of peace and love i.e. Barak Valley. Thereby, Sir Fuller directed the educational director of Assam to initiate the steps required to fulfil this noble purpose. Finally, on 4th April 1906, proposal for establishing the Normal School was granted.

This institution has been an inspiration to the people of this valley. Uncountable students have lightened up their careers and have attained success in their professional life along with good reputation in the society.



Normal School Building, Silchar

8.3.2.5 District Registration Office

District Registration Building is a British colonial time constructed building. Located at Tarapur area just opposite to Indian Post Office building, the registration office is still functioning for all district registration work. This Assam type British architectural piece could be well developed by renovation and repair work.



District Registration Office, Silchar

8.3.2.6 District and Session Judge Bungalow

Located at Lumding-Silchar Road (present NH-37), just opposite to Police Parade Ground, District and Session Judge Bungalow is a British built Assam type two story building. The resident is surrounded by lush green garden and old tree clads. This historical and heritage building could be preserved with proper restoration and renovation.



8.4 ISSUES

Dilapidated Condition of structures: Some of the heritage structures are in dilapidated condition due to the unavailability of conservation, restoration and preservation practices in Silchar area. These structures need periodic preservatory treatments in order to enhance their cultural life for coming generations.

Unavailability of Infrastructure and Services: There is an absolute absence of proper infrastructure and services in the immediate areas around the possible heritage as well as tourist spots of Silchar. The basic tourist amenities also lack at these places which have to be planned accordingly.

Absence of Monitoring: There is no nodal body responsible for periodic monitoring of the heritage structure around Silchar. Such nodal bodies are to be constituted in order to provide proper jurisdiction to such capable heritage areas so that there's no threat to them in future.

Haphazard Development: The unplanned developmental activities around the heritage sites are serious threats and it harms the integrity of the heritage structures. Such activities are to be monitored by a proper administrative framework under by the local, regional or state authorities.

Lack of Awareness among Public: The citizens are unaware about the cultural assets owned by them and they are to be made aware in order to have proper public participation in order to preserve such important historic sites. Public participation is an utmost important aspect for the conservation of any site.

Absence of Legal Plan: There is an absence of a visionary master plan available specifically for the heritage sites in Silchar. Such important sites require a separate space in the administrative framework of the authorities in the form of a legal document which has been prepared after consulting proper stakeholders and experts.

Documentation of Heritage Structure: The heritage structures of Silchar region are not documented till date. There is a need of proper listing and documentation of heritage sites in Silchar. Such sites are to be properly listed under various grades of their importance and documented specifically so that a proper conservation approach can be implemented for such important sites.

8.5 PROPOSED STRATEGIES

8.5.1 HERITAGE MANAGEMENT AND ORGANIZATIONAL STRUCTURE

There is a need to setup a Heritage Committee for Silchar Panning Area. The concerned Development There is a need to setup a Heritage Committee for Silchar Panning Area. The concerned Development Authorities/ municipalities as well as local stakeholders, NGOs have significant role to play in successful implementation of strategies proposed for Silchar's Areas.

Formulations of special regulations to control or mediate development within the available heritage areas are a prerequisite for effective implementation of the proposed recommendations. Special regulations for all development within heritage areas, including new construction, demolition or modification to existing buildings around historic structures or within historic precincts must be formulated by the concerned authority with the advice of Heritage Committee.

Detail plans must be prepared by respective development Authorities and Municipalities. It is necessary to prepare an inventory of built, cultural and natural heritage resources of the special areas. The inventory must include both protected and unprotected resources. the cost for most of the new developments in special heritage areas is already covered in budget allocation for 'Tourism, Recreation and Culture' and hence not included in this table. Estimates for projects those are specific for preservation of heritage resources are only included.

8.5.2 HERITAGE CONSERVATION PROPOSAL



Figure 167 Heritage Conservation process

Where to start	Institutional setup	Special Control Areas
<ul style="list-style-type: none"> • Listing of buildings • Locating on city map • Form clusters of significant buildings • Name as Heritage Zone/ Conservation Zone 	<ul style="list-style-type: none"> • Institutions responsible for maintenance – ULB, PPA, TCPD, ASI, state Depts. • Inter institution linkages – ULB, ASI, INTACH • Heritage Cell • Civil society groups/industrial house 	<ul style="list-style-type: none"> • For heritage structures and precincts • Controlled Development • Heritage Conservation Committee

Figure 168 Heritage Conservation Chart

The primary objective of listing is to record extant architectural heritage and sites and the outcome of this process should invariably be to grade the heritage by a multidisciplinary team of experts whose recommendations should be available for public stakeholders and they can assess those for further changes if required. The importance of this process cannot be underestimated because its results determine subsequent conservation decisions and it facilitates the prioritisation of decisions relating to the future of architectural heritage and sites.

Listing does not prevent change of ownership or usage but change of use of such Listed Heritage Building / Listed Precincts is not permitted without the prior approval of the Heritage Conservation Committee. Listed Heritage Buildings / Listed Heritage Precincts may be graded into three categories. The definition of these and basic guidelines for development permissions are as follows:

Grade-I	Grade-II	Grade-III
(A) Definition: Heritage Grade-I comprises buildings and precincts of national or historic importance, embodying excellence in architectural style, design, technology and material usage and/or aesthetics; they may be associated with a great historic event, personality, movement or institution. They have been and are the prime landmarks of the region. All-natural sites shall fall within Grade-I.	Heritage Grade-II (A&B) comprises of buildings and precincts of regional or local importance possessing special architectural or aesthetic merit, or cultural or historical significance though of a lower scale than Heritage Grade-I. They are local landmarks, which contribute to the image and identity of the region. They may be the work of master craftsmen or may be models of proportion and ornamentation or designed to suit a particular climate.	Heritage Grade-III comprises building and precincts of importance for townscape; that evoke architectural, aesthetic, or sociological interest through not as much as in Heritage Grade-II. These contribute to determine the character of the locality and can be representative of lifestyle of a particular community or region and may also be distinguished by setting, or special character of the façade and uniformity of height, width and scale.
(B) Objective: Heritage Grade-I richly deserves careful preservation.	Heritage Grade-II deserves intelligent conservation	Heritage Grade-II deserves intelligent conservation (though on a lesser scale than Grade-II and special protection to unique features and attributes).
(C) Scope for Changes: No interventions be permitted either on exterior or interior of the heritage building or natural features unless it is necessary in the interest of strengthening and prolonging the life of the buildings/or precincts or any part or features thereof. For this purpose, absolutely essential and minimum changes would be allowed and they must be in conformity with the original.	Grade-II(A) : Internal changes and adaptive re-use may by and large be allowed but subject to strict scrutiny. Care would be taken to ensure the conservation of all special aspects for which it is included in Heritage Grade-II. Grade-II (B) : In addition to the above, extension or additional building in the same plot or compound could in certain circumstances, be allowed provided that the extension / additional building is in harmony with (and does not detract from) the existing heritage building(s) or precincts especially in terms of height and façade	Not Requires
(D) Procedure: Development permission for the changes would be given on the advice of the Heritage Conservation Committee.	Development permission for the changes would be given on the advice of the Heritage Conservation Committee.	Development permission for changes would be given on the advice of the Heritage Conservation Committee.
(E) Vistas / Surrounding Development: All development in areas surrounding Heritage Grade-I shall be regulated and controlled, ensuring that it does not mar the grandeur of, or view from Heritage Grade-I.	All development in areas surrounding Heritage Grade-II shall be regulated and controlled, ensuring that it does not mar the grandeur of, or view from Heritage Grade-II	All development in areas surrounding Heritage Grade-III shall be regulated and controlled, ensuring that it does not mar the grandeur of, or view from Heritage Grade-III.

For the conservation of heritage buildings, the abovesaid steps are to be followed.

(Source: CPWD)

8.5.3 POLICIES ON CULTURAL DEVELOPMENT IN SILCHAR

The proposals for propagation and development of Cultural activities at Silchar include:

- Promotion of Traditional Fairs and Festivals through government and NGOs participation so as to generate awareness among the new generation towards rich cultural heritage and inviting cultural tourism.
- Development of a Cultural Complex at Silchar with infrastructural development for round the year activities
- Centre for Development of Handicrafts and tourism promotion for the region.

8.4.4 UNESCO NOMINATION UNDER THE WORLD HERITAGE SITE

The historic site of Kachari King's Fort (Khaspur), the buildings of Kachari Kingdom along with other important sites related to Kachari Empire in the District, can be nominated for the World Heritage Site nomination as it is an important part of the earlier dynasties and has proven instrumental in shaping the cultural fabric of Cachar region which is thriving till date. It has found some studies that Dimasa kingdom was shifted to Khaspur in around 1750 (Endle 1911:6)², and here the Dimasas gradually came under Hindu influence. Raja Krishna Chandra and his brother Govinda Chandra performed a public ceremony for Brahmins, and they declared themselves Hindus of the Kshatriya caste and took on the surname 'Barman'. The Kacharis belong to the Indo-Mongoloid peoples and the Tibeto-Burmese linguistic family (Choudhury 2006:18)³. The term 'Kachari' is commonly used for the group of ethnic communities that includes Bodo, Rabha, Mech, Koch, Dhimals, Saraniya, Dimasa, Hojai, Lalungs, Garo, Hajong, Hill Tipprass, Sutiya and Morans (Endle 1911:5). Believed to be among the earliest inhabitants of North-east India, the Kacharis are spread across North Bengal, Assam and Tripura.

Thus, Silchar authorities can take up an initiative with proper experts in preparing a document specifically mentioning the importance of Kacharis with the reference to their culture which can be used for tentative nomination in UNESCO by the state parties.

8.6 CONCLUSION

The relevant policy guidelines and management of cultural and natural heritage can rejuvenate and revitalize the Silchar region and support the existing cultural identity. It can also promote tourism, boost local economy and contribute a great sense of pride amongst the residents and become a touchstone for future development.

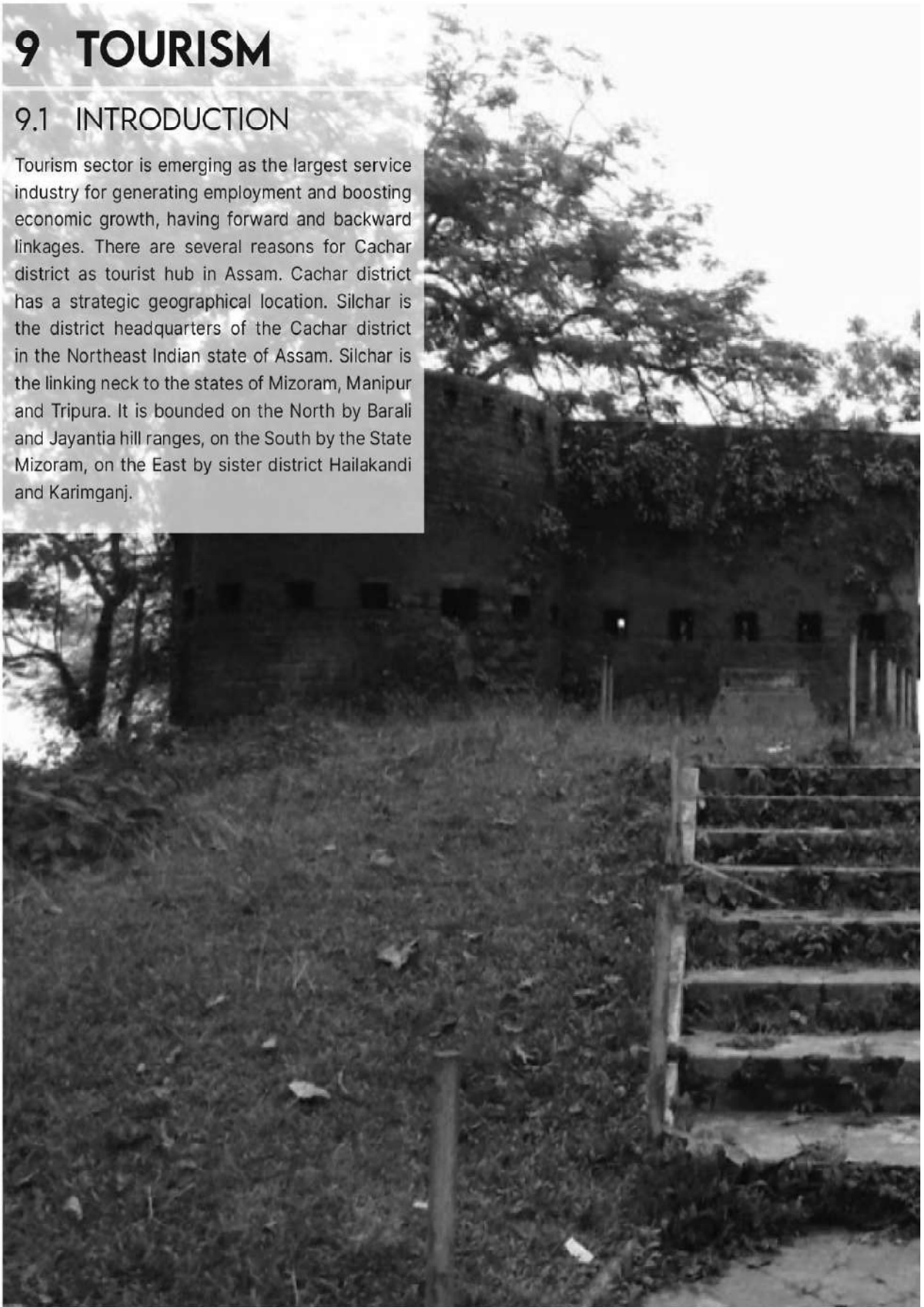
²Endle, Sidney. 1911. The Kacharis. London: Macmillan and Co Limited.

³Choudhury, Sujit. 2006. Shrihatta Cacharer Prachin Itihas. Silchar: Dinkal Press Limited.

9 TOURISM

9.1 INTRODUCTION

Tourism sector is emerging as the largest service industry for generating employment and boosting economic growth, having forward and backward linkages. There are several reasons for Cachar district as tourist hub in Assam. Cachar district has a strategic geographical location. Silchar is the district headquarters of the Cachar district in the Northeast Indian state of Assam. Silchar is the linking neck to the states of Mizoram, Manipur and Tripura. It is bounded on the North by Barali and Jayantia hill ranges, on the South by the State Mizoram, on the East by sister district Hailakandi and Karimganj.





Badarpur Fort, Silchar

9.2 TOURISM IN SILCHAR

Tucked away in the state of Assam in India, next to the Barak River, the land is fondly known as the "Island of peace". Buried with history and culture, the land is famous for Temples and its connection towards Lord Krishna and the Hindu religion. The land is beautifully green and has got a charm that can keep you hypnotized in the town's beauty. Silchar attracts tourists in great numbers thanks to its natural beauty, rich and diversified culture.

During the British rule, ships were docked at the bank of the "River Barak" so a market developed at the bank and became a major place of economic activity. The bank was covered with stones to help dock ships and vessels, and the market developed at a place which was fully covered with stones. People started to refer to the place as "Shiler Chor", meaning a bank of stone. Gradually "Shiler Chor" became "Silchar" for linguistic simplification and, later on, British officials started to use "Silchar" in their official documents referring to the surrounding area of the market. "Silchar" became the official name of the place.

Silchar saw one of the uprisings in favour of the Bengali language. When the Assam government, under Chief Minister Bimala Prasad Chaliha, passed a circular to make Assamese mandatory, Bengalis of Barak Valley protested. On 19 May 1961, when Assam police opened fire on unarmed protesters at Silchar Railway Station, 11 agitators died. After the popular revolt, the Assam government had to withdraw the circular and Bengali was ultimately given official status in the three districts of Barak Valley.

9.2.1 TOURIST DESTINATIONS FROM SILCHAR

9.2.1.1 Jatinga

Jatinga is a scenic hill station situated around 80 kilometers away from Silchar. The town is located amidst towering hills and lush greenery and is a great destination for a weekend getaway. The village of Jatinga gained fame because of the unusual phenomena of birds committing suicide seen here. The village also came to be known as the "The valley of death for birds". Later studies revealed that the birds don't actually commit suicide but are killed by the locals with bamboo poles. Nonetheless, Jatinga is one of the most popular hill stations in Assam and attracts tourists in huge numbers. Jatinga, a small tribal village and Assam's only hill station, is known for the mysterious suicide of birds during certain weeks of the year. After monsoon season, usually in September and October and only occurring on dark moonless nights, 44 species of bird in Jatinga suddenly become disturbed between the hours of 6-9:30pm. Strangely becoming disoriented, the birds plunge toward the torches and lights of the cities.



9.2.1.2 Badarpur fort

The Badarpur Fort is a historical place in the city of Silchar. It is situated on the banks of the Barak River.

The fort still stands in spite of the years gone by. Even in its ruins, it still exudes a historical charm which attracts tourists in large numbers. The view of the Barak River from the fort is beautiful. The actual name of the fort is Historical Fort. Located on the bank of river Barak, Badarpur Fort is an important tourist destination. It is a vintage fort built by Cachari King to spend some peaceful time on the bank of the Barak river. The fort is a part of very big structure. Many tall trees are present inside as well as surrounding the fort which keeps it cool. It is spread over a vast area and the view of the Barak river from here is extremely pleasant. The fort's architectural structure reveals a Mughal Provincial style as said by Karimganj Deputy. There were some small equipment for children to play inside but due to the poor maintenance of the fort, it is in ruins now. This fort is located at crossroads of National Highway 44 and 58 and Badarpur Railway Junction and is of special interest to the tourists from Bangladesh as they have a shared history with the area. A festival called Baruni Mela is celebrated at the bank of river Barak which can be enjoyed from the fort as one can get a clear view of the river from here.



Badarpur fort, Silchar

9.2.1.3 Bhuban Mahadev temple

Located about 40 km south of Silchar is the Bhuban Mahadev Temple, a medieval age temple dedicated to Lord Shiva. The temple is located atop the Bhuban Hill and was built by Kachari King Lakshmi Chandra. The temple has the idols of Lord Shiva and Goddess Parvati and is built of solid rock. The craftsmanship of the temple is unique and reflects the best of Kachari architecture that can be found in different places of the ancient kingdom. Bhuban Mahadev Temple attracts devotees from all over the country, especially during the festival of Shivaratri. The trek up to the temple from the base of the hill offers a great experience to the tourists and offers you a glimpse of the pristine surroundings. Bhuban Hill offers a bird's eye view of the neighbouring valley which is a treat for the visitors. The Bhuban Hills, in the southeast of Barak Valley bordering Manipur and Mizoram, is a popular pilgrimage destination.

The Shiva temple, nestled on top of the hills covered with deep forests, is associated with many legends. Lakhs of people congregate during the traditional Bhuban Fair, organised here on Mahashivratri every year.



Bhuwan Mahadev temple, Silchar

9.2.1.4 Sri Radhaballav Rai Kalachand Ashram

It is the Ashram of Baba Kalachand in the outskirts of Silchar. It falls in the way of Kunbhigram Airport. The locality is very peaceful around the Ashram and it is rich with local environment. During Sundays, gatherings take place and annya prasad is distributed among the devotees. The place also consists of Durga temple and kadamb trees. The place is rich with spiritual environment and local culture..



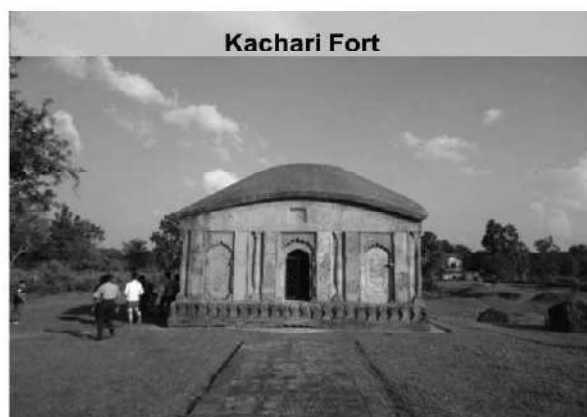
9.2.2 TOURISM DESTINATIONS IN SILCHAR WITHIN 25 K.M.

9.2.2.1 Maniharan Tunnel

Another attraction very near to this temple is the Maniharan Tunnel where the holy waters of Tribeni flows and many people visit here to take bath. Number of festivals are also celebrated here along with a fun fair where the people of Assam and other nearby places come to participate.



Maniharan Tunnel, Bhuvan Hills



Kachari Fort



Ruins of Kachari Fort

9.2.2.2 Kachari Fort

The Cachar district in Assam has a very important historical connection as it used to be the capital of the Cachar Kings during the medieval times. 20 km from Silchar this fort is one of the famous historical forts and very magnificent, Khaspur which makes the place more interesting. It reflects the rich cultural heritage of the ancient era through the fine quality of work done by the engineers of those times. The fort is covered on all sides by the lush greenery which makes the place picturesque. The beautiful carvings on the walls of the fort depict the lifestyle that the people of Assam had in those times. This fort used to be the pride of the Kachari kingdom, and the existence of this site even today enhances the glory of Assam. Visiting this fort is a treat to the eyes as you get to see the heritage of the state which has been preserved with a lot of effort. Although the walls of the fort look worn out due to ages, but the smell of our ancient days makes the place worth visiting. You get the touch of both Hinduism as well as the non-Aryan culture at the Kachari Fort



9.2.2.3 Kanch Kanti Kali Mandir

This is one of the most renowned temples in South Assam and is about 11 kilometers away from Silchar. Kanch Kanti Kali Mandir was built in the 19th century by the then Kachari king. This beautiful temple situated in a scenic setting is a must-visit while you are in Silchar. The temple is dedicated to the mother goddess "Kanch Kanti", who is believed to be an amalgam of two goddesses, Kali and Durga, and hence is considered very powerful.

9.2.2.4 Dolu Lake

Dolu Lake is situated 15 km from the city center of silchar, a picturesque lake in the city of Silchar in Assam. The lake is situated in a tranquil environment, in the lap of nature. It is a perfect picnic spot. The scenery is a refreshing break from the usual city landscape. Situated away from the bustling cities, Dolu Lake is one of the most beautiful tourist sites in Silchar.



Dolu Lake, Silchar

9.2.2.5 Gandhibag

Gandhibagh Park is a beautiful park located at the heart of the city of Silchar. The park is named after Mahatma Gandhi.

The Shahid Minar lies within the park. It was built as a memorial for the 11 martyrs, who died on 19th May, 1962. It was due to the violent struggle against the Government of Assam for the protection of Bengali language. The main attraction in the park is the Toy Train. A ride in the train is the most thrilling experience for children who visit the park.



Gandhibagh, Silchar

9.3 PROPOSED STRATEGIES TO BOOST TOURISM

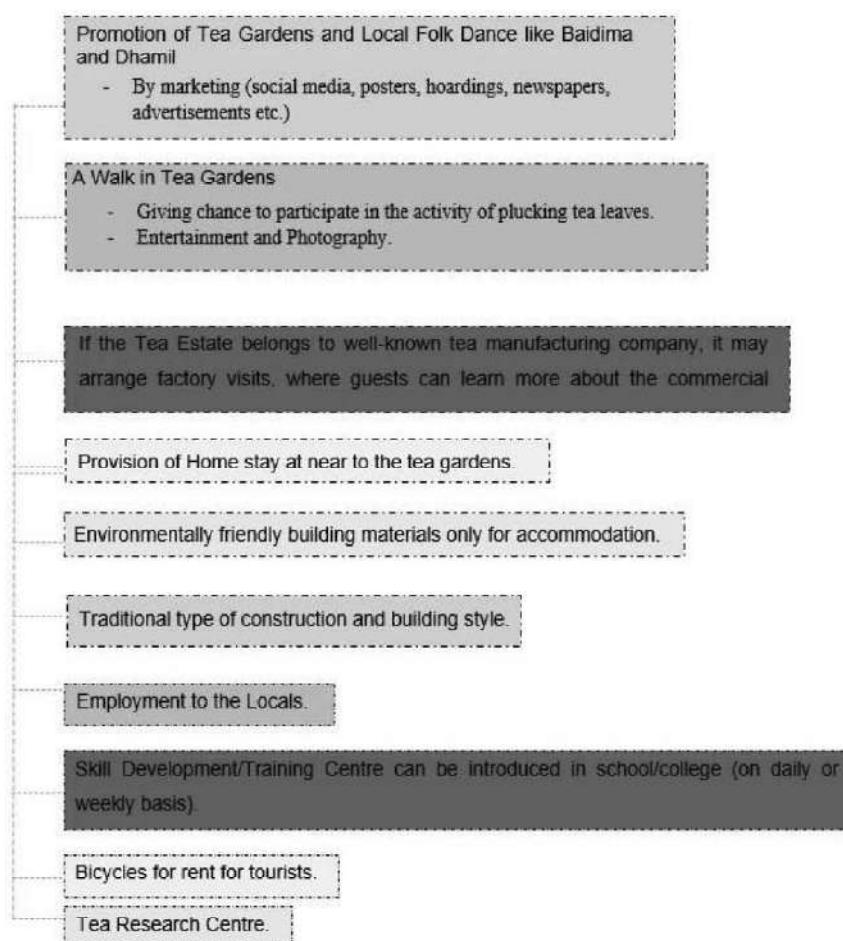
As a service industry, tourism has numerous tangible and intangible elements. Major tangible elements include transportation, accommodation, and other components of a hospitality industry. Major intangible elements relate to the purpose or motivation for becoming a tourist, such as rest, relaxation, the opportunity to meet new people and experience other cultures, or simply to do something different or have an adventure.

Tourism is vital for every place, due to the income generated by the consumption of goods and services by tourists, the taxes levied on businesses in the tourism industry, and the opportunity for employment and economic advancement by working in the industry. For these reasons government and private agencies sometimes promote a specific region as a tourist destination, and support the development of a tourism industry in that area. The contemporary phenomenon of mass tourism may sometimes result in overdevelopment; however alternative forms of tourism such as ecotourism seek to avoid such outcomes by pursuing tourism in a sustainable way.

Silchar Region offer great potential for tourism development. According to the existing scenario analysis, it has been observed that the following categories of tourism have immense potentialities for this region:

- Religious Tourism with historically important structures such as temples and other outdoor worshipping areas in the vicinity
- Cultural and Heritage Tourism with annual / seasonal traditional village fairs, British colonial establishments and festivals, folk or tribal socio-cultural events with arts, crafts, music, dance etc.
- Nature based outdoor recreation and Eco-tourism for hills, forest, riverfront, and vast agricultural area/ village settlements with undulating landforms including picnic spots, sightseeing, camping sites etc. Presence of all these tourism products calls for the growth of Adventure Tourism.

9.3.1 STRATEGIES FOR TEA TOURISM



9.3.2 CAPACITY BUILDING

- Selected villages should be given assistance for showcasing of handlooms and handicrafts to help the villagers sell their products. The Handloom Trade Centre can be proposed at Ambikapur VI just near the proposed Gorakuri Lake and Amusement Park as the place will be consumer friendly.
- If necessary, city can have tea exhibition centres for a group of tea growing villages also. That will also serve as tea museum and will attract tourist and hence will boost the tea economy.
- Local Art and Craft centers can be proposed. This will help to sustain the crafts as these activities will help generate income for the villagers.
- Local youths can be trained to become tourist guides. They already have adequate knowledge about the places; they just need to be trained to enhance their soft skills so that they are in a better position to interact with the tourists.
- To develop a proper website, that enables to give enough information to domestic and foreign tourists.

9.3.3 STRATEGIES FOR CULTURAL COMPLEX CUM PARK DEVELOPMENT

- One cultural hub come park could be developed where the art of the different community people can be placed, and the place should be designed in such a way that it should be environmentally friendly.
- Considering the reach history from 5th Century Chandrapuri Vishaya, Bhauma-Narka Kingdom, Koch Kingdom, Dimasa Kachari Kingdome to Raja Govinda Chandra Kingdom and earlier rulers, the city must have a cultural park show casing the history and urban evolution of city.
- Looking into the need for upcoming generation one Cultural complex has been proposed at Gangapur as a place of recreation and Cultural exhibition.
- One side of the hub cane be used to exhibit their traditional ornaments, dresses and food so that tourist can also enjoy their culture and tradition.
- The other side can be used for recreational which includes landscape and sculptures.
- The facilities like parking, drinking water and toilets should be provided inside the park.



- Promotion of Traditional Fairs and Festivals through government and NGOs participation so as to generate awareness among the new generation towards rich cultural heritage and inviting cultural tourism.
- Centre for Development of handicrafts development and tourism promotion for the region.

9.3.4 STRATEGIES TO BOOST REGIONAL CULTURE

- The regional inhabitants include the Dimasa Kachari, Rajbanshi, Meitei, Bishnupriya, Rangmai Naga, Khasi, Karbi and tea garden tribes. Apart from these, Bengalis are the largest segment of the habitants. Marwari and Bhojpuri-speaking peoples also live here in fair numbers. They had different culture and tradition on their own way.
- They celebrate the Bihu and Durga puja as major festivals on their own culture and tradition.
- Dances like Baidima (Dimasa Kachari), Dhamil (Bengali Folk Dance) etc. are performed by the people at the time of their festivals.

The existing open spaces should be used for multipurpose such as that should be provided to the different communities during their festival times to show case their culture and tradition. Temporary commercial stalls should be developed, and no permanent construction should be constructed, and basic infrastructure facilities should be provided to avoid problems.

9.3.5 STRATEGIES FOR DEVELOPMENT OF RECREATIONAL AREA

Recreation is any physical or psychological revitalization through the voluntary pursuit of leisure time. It is an activity which is relaxing to people and provides diversions from their normal routine. Generally, there are four types of recreation activities:

- **Revitalization:** restoration and enhancement of mental and physical health.
- **Play:** relaxation and exercise
- **Adventure:** excitement and challenge
- **Education:** organized and incidental

City level recreational facilities are of two types:

- **Indoor facilities** consist of libraries, clubs, cinema hall, auditorium, multiplex, art and craft centre, shopping malls, food courts, cyber cafés, gymnasium etc.
- **Outdoor recreation facilities** consist of gardens, parks, play grounds, golf courses, zoo, botanical garden, race course, stadium, exhibition ground, water sports complex, green ways, bike ways etc.

9.3.5.1 Proposals for Augmentation and Development of Recreational Facilities

- Development of green belts, plantations, parks, Ghats, plazas along the Brahmaputra riverfront abreast the Urban set up and invite nature in harsh built environment through myriad ways.
- Amusement Parks to be developed along with horticulture, Pisciculture, herbal parks, etc.
- Development of eco-tourism with provision of water theme parks, lagoon resorts, weekend resorts and world class recreation centres such as club towns, spa resorts, etc. at Planning Area level.

9.3.6 POLICIES FOR TOURISM DEVELOPMENT

As a service industry, tourism has numerous tangible and intangible elements. Major tangible elements include transportation, accommodation, and other components of a hospitality industry. Major intangible elements relate to the purpose or motivation for becoming a tourist, such as rest, relaxation, the opportunity to meet new people and experience other cultures, or simply to do something different or have an adventure.

Tourism is vital for every place, due to the income generated by the consumption of goods and services by tourists, the taxes levied on businesses in the tourism industry, and the opportunity for employment and economic advancement by working in the industry. For these reasons government and private agencies sometimes promote a specific region as a tourist destination and support the development of a tourism industry in that area. The contemporary phenomenon of mass tourism may sometimes result in overdevelopment; however alternative forms of tourism such as ecotourism seek to avoid such outcomes by pursuing tourism in a sustainable way.

Silchar Region offer great potential for tourism development. According to the existing scenario analysis, it has been observed that the following categories of tourism have immense potentialities for this region:

- Nature based outdoor recreation and Eco-tourism for Tea estates, botanical garden, forest, riverfront and vast agricultural area/ village settlements with undulating landforms including picnic spots, sightseeing, camping sites etc. Presence of all these tourism products calls for the growth of Adventure Tourism.
- Religious Tourism with historically important structures such as temples and other outdoor worshipping areas in the vicinity.
- Heritage Tourism with old architectural building, British dynasty build old Silchar Town Railway Station and annual/seasonal traditional village fairs and festivals, folk or tribal socio-cultural events with arts, crafts, music, dance etc.

9.3.6.1 Common Strategies

- Promote Homestays to help tourists experience Silchar's culture.
- The Govt. wants to boost tourism in and around Silchar. As part of this, they intend to promote homestay, heritage and spiritual Tourism circuit in the SMPA.
- Targeting the middle and upper middle-class tourists, the homestay units are proposed which will enable them to experience Silchar hospitality, cuisine, customs and traditions by staying with families.
- This system will benefit the owner of the house and make it easy for tourists who find it difficult to get hotel accommodation in peak season.
- Under the Heritage Circuit the following works can be taken up:
 - o Revitalization of streetscapes in the Heritage Area in Silchar
 - o Beautification and improvement of Capital Road, Circuit House Road and Court Road in Silchar being a major heritage center of city.
 - o Beautification of Rangirkhari Canal passing through core city area of Silchar.
 - o Toilet facilities to be provided at tourist spots
- As part of the Heritage Circuit project, development of infrastructure in key sites such as Kachari Fort, Badarpur Fort, Circuit House, Judicial District Court and India Club.
- Public toilets at every major junction and public gathering spots as well as developing areas are to be provided for public convenience. It is to be provided especially in area where the tourists inflow is higher so that it can be utilized fully.

- Guided boat rides on the river could be provided to the resort guests who show a preference for it. Angling kit could be provided too for those who wish to amuse themselves with on-board fishing.
- By providing suitable incentives, encourage setting up at choice locations a few beer pubs which have aesthetic and upscale ambience. Tourists and commercial travelers who do not take up hotel accommodation during their visit to Silchar are likely to patronize such bars.
- Establishment of budget accommodation at one or more suitable locations to cater to the short-period lodging facilities required by visiting artists for participation in the cultural / fine arts / religious festivals, pilgrims, sports persons, student groups / others may be examined by the tourism authorities. Alternatively, like the Greyhound bus stations in the USA, locker-chests and wash facilities may be provided for those who opt for these amenities only instead of room accommodation.
- Establishment of "My Bike, My City " concept to help visitors explore the entire city and tourist spots independently by promoting e-Bicycle concept locally.
- None of the leading national hospitality chains such as the Taj, Oberoi, Leela group and ITC hotels division have yet to come to Silchar. Presence of quality national and international hotel chains will not only attract the high spending domestic / foreign tourists but also attract business conferences / seminars / workshops etc. Suitable steps may be taken in this regard by the authorities concerned to promote holding of conferences / seminars etc in the better class Silchar hotels / resorts.
- Development of District Sport Complex, International Stadium, Cultural Complex, River Front, Amusement Park, Water Sport Complex and International Hospitality Chains will probably help boost tourism sector of Silchar hence boost in local urban-rural economy.

9.3.7 INTEGRATED APPROACH FOR DEVELOPMENT OF TOURISM

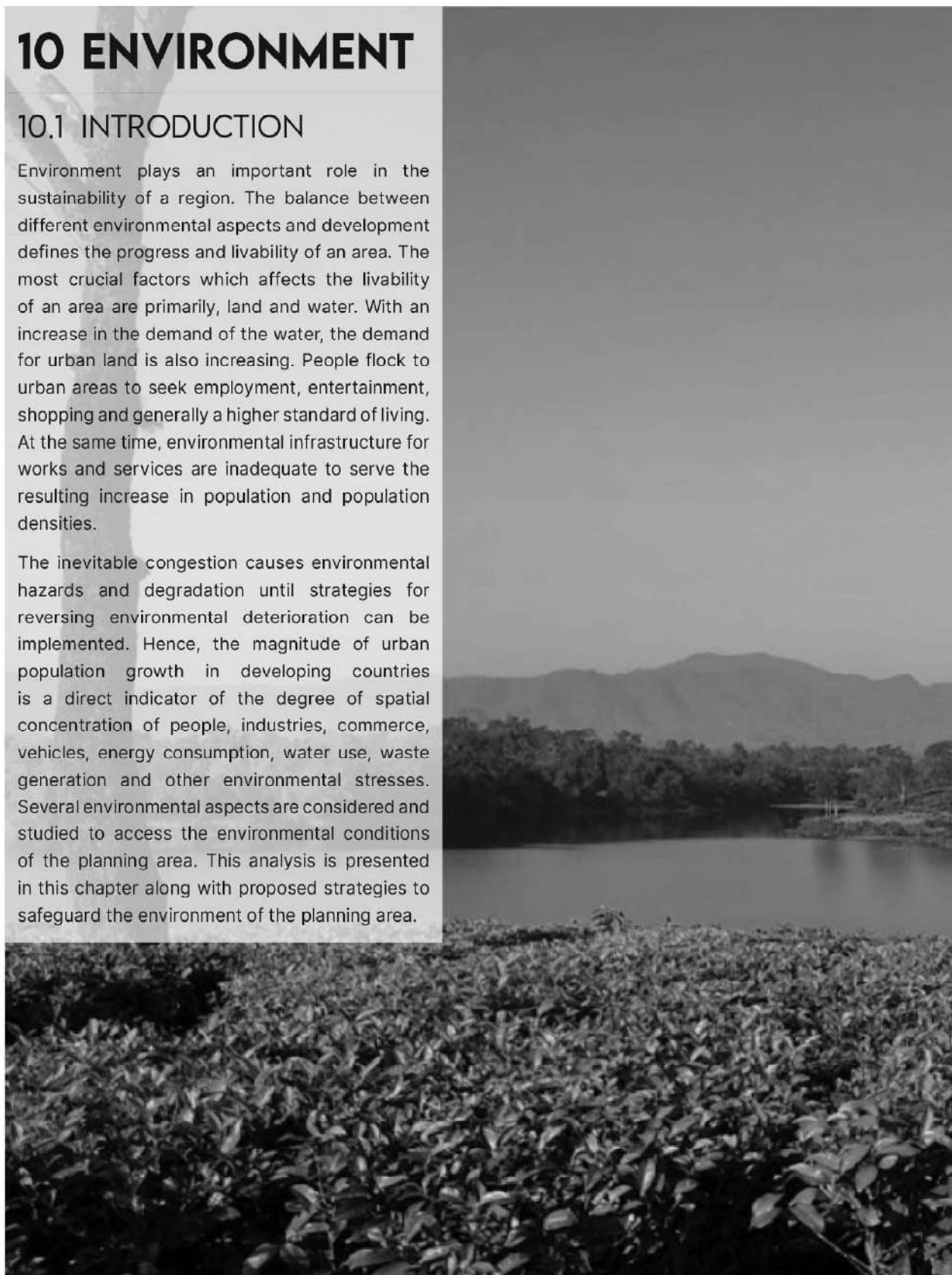
- Regulating and planning for Tourism to preserve ecology, environment and areas of tourism value.
- Reducing pressure on Silchar city by planning, developing self-contained state of art Tourist destinations in the surrounding settlements.
- Eliminating haphazard and unplanned/ sub-standard development around sites of tourism value.
- Promote Silchar as a Quality Tourist destination rather than as a mass tourist place.
- Leveraging the concept of Eco-Tourism for the development of places of tourist value.
- Leveraging Tourism for promoting and enhancing the state economy and generation of employment.
- Planning tourism supportive infrastructure with care and put in place on priority in order to exploit the full potential of tourism.
- Planning and developing state of art Convention Centres and supportive facilities to make Silchar Global Convention Hub.
- Making adequate arrangements for parking as part of the planning tourist sites.
- Planning the circulation pattern for tourist in such a way that City tours can be held for tourists visiting the local sites of heritage value.
- Making Provisions for Public Transportation so that City Bus Tours can be taken up to promote tourism within the city and to minimize traffic on the roads.
- Leveraging strength of Boats to start city tours involving various water bodies, lakes and rivers.
- Coordinated Marketing to attract more tourists from other states and foreigners.
- Enhancing Product Quality so as to create a brand image for tourist destinations and enhancing service quality.
- Enabling Private Sector Participation for accelerated growth of the industry and efficiency in facilities and services.

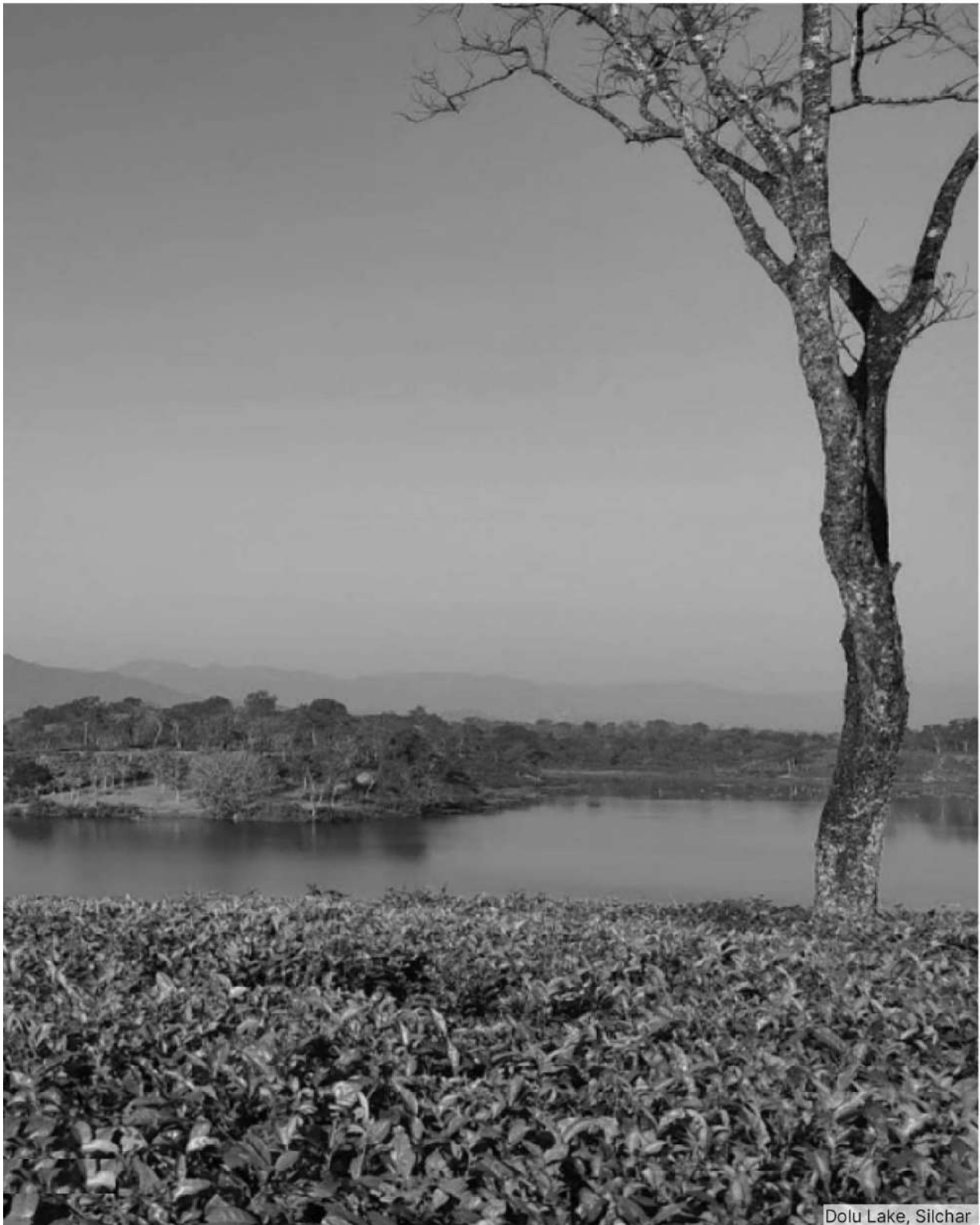
10 ENVIRONMENT

10.1 INTRODUCTION

Environment plays an important role in the sustainability of a region. The balance between different environmental aspects and development defines the progress and livability of an area. The most crucial factors which affects the livability of an area are primarily, land and water. With an increase in the demand of the water, the demand for urban land is also increasing. People flock to urban areas to seek employment, entertainment, shopping and generally a higher standard of living. At the same time, environmental infrastructure for works and services are inadequate to serve the resulting increase in population and population densities.

The inevitable congestion causes environmental hazards and degradation until strategies for reversing environmental deterioration can be implemented. Hence, the magnitude of urban population growth in developing countries is a direct indicator of the degree of spatial concentration of people, industries, commerce, vehicles, energy consumption, water use, waste generation and other environmental stresses. Several environmental aspects are considered and studied to access the environmental conditions of the planning area. This analysis is presented in this chapter along with proposed strategies to safeguard the environment of the planning area.





Dolu Lake, Silchar

10.2 GEOGRAPHY

Silchar is located in the southernmost part of Assam. It is located between longitudes 92°24' E and 93°15' E and latitudes 24°22'N and 25°8'N East and is 35 meters above mean sea level. The city is located in an alluvial flat plain with swamps, streams, and isolated small hills (locally known as tilla) marking its landscape. Apart from Barak river, the other major river is Ghagra river.

Silchar is in Zone V on the Seismic Zonation Map and has witnessed major earthquakes. The earthquake in January 1869 was of magnitude of 7.5 on the Richter scale and caused heavy damage. Other significant earthquakes include those in 1947 (magnitude 7.7), 1957 (7.0) and 1984 (6.0).

Silchar falls in the Barak valley. The Barak Valley falling in Assam in Northeast India belongs to the Indo-Burma Hotspots and is one of the most biologically diverse regions in the country. Barak Valley constitutes 8.9% geographical area of the state covering an area of 6922 sq km. the land use/land cover area of the valley may be characterized by its evergreen forests, agricultural land, and tea plantations. Barak Valley has 12 Reserve forests, (RFs) and one Wildlife Sanctuary (WLS).

Generally, the daily temperature in the Silchar is about 15°C in January. From April it rises and in July, the mean temperature ranges from 25 to 27°C. During October, the daily mean temperature is above 25 C. The subtropical climate of this valley is characterised by high rainfall and high humidity and can be characterised by three dominant seasons viz; winter (November–February), summer (March–May) and monsoon (June–October).



Barak River, Silchar

10.3 PHYSIOGRAPHY

Physiographically, Silchar consists of hilly terrain surrounded by the border on North-West sides with bowl shaped synclinal valley elongated towards south. Silchar's topography is highly broken and undulated in nature. The town area of Silchar is located in an alluvial flat plain, spotted with swamps and bisected by stream and surrounded by isolated small hills (tillas). During the rainy season, River Barak flows and cause heavy flood to the town. Inundation is common phenomenon in Silchar due to the presence of Ghagra river in the west side of the town and other streams. Its undulating and above 79 feet from MSL.

10.4 GROUND WATER

Ground water occurs in phreatic condition in shallow aquifer and in semi-confined condition in deeper aquifer. Flow of ground water is from the North to South in northern parts and from South to North in southern parts of the city. The pre-monsoon water level is 1.05 m bgl while the post-monsoon water level is 1.62 m bgl. The water level

fluctuation in general is less than 1.00 m. However, in fringe areas of Mohanpur, Srikona, Rangpur, Kashipur and Rajabazar, it ranges from 4.41 to 6.96 m.

From quality point of view, the ground water in Silchar is suitable for domestic, irrigation and industrial uses except for some isolated areas where high concentration of iron is observed.

The estimated Annual replenishable ground water resources are 2239.21 mcm against net annual ground water draft of 32.65 mcm. The projected demand for domestic and industrial use of ground water up to 2025 is only 52.46 mcm. The stage of ground water development in the district is only 2%.

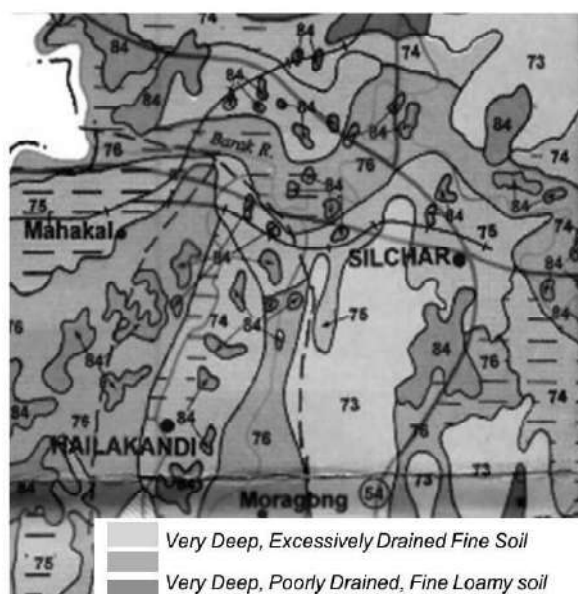
The present ground water utilization is mainly for domestic uses. As per record, only 1 scheme with ground water is operated which irrigates 12 ha of land in Rabi and 10 ha land in Kharif season. Public Health Engineering Department, Govt. of Assam has constructed so many shallow and medium tube wells in the district for rural water supply.

10.4.1 GROUND WATER SCENARIO

The entire area of region is represented by i) unconsolidated, ii) semi-consolidated and iii) consolidated (Compact formation of Tertiary) formations and these units are as follows.

1. Very compact formations comprising the Surma and Dihing series of rocks,
2. Semi-consolidated rocks comprising Tipam and Dupitila formations, and
3. Unconsolidated formation of alluvial deposits.

The semi-consolidated Tipam sandstones form good repository in the area. The depth to water level varies from a few metre to 4 m bgl in alluvial sediments particularly in north and south of Silchar and in western parts while it varies from a few metre to 2 m bgl in the central parts. The hydraulic gradient of ground water is from North to South in northern parts and ground water flows from South to North-West in southern parts. The static water level in shallow aquifers (within 5m) is within 1.3 to 4.0 m bgl in the North of the Barak River and it varies from 1.8 to 2.22 m bgl in southern



parts. Discharge of tube well varies from 5.5 to 8 m³/hr with drawdown of 6 m. The storability value varies from 8.8×10^{-4} to 4.14×10^{-3} . The hydraulic conductivity is low in Badribasti area and ranges between 6.1 to 45.23 m/day in the region.

In the deeper aquifer, the granular zone occurs below a confining layer of clay, thus it is a confined aquifer. The static water level ranges from 1.92 to 6.88 m bgl in northern parts and from 0.50 to 8.50 m bgl in the southern parts of the River Barak. The yield of the tube well varies from 33 to 88 m³/hr with drawdown varying between 9.9 to 32.65 m. (Source: Central Ground Water Board Report, MoWR)

10.4.2 GROUND WATER QUALITY

From the quality point of view, ground water attains its suitability for drinking as well as irrigation purposes. Ground water is slightly alkaline in nature (pH: 7.2-8.6) with Electrical conductivity value of 160-630 Micromhos/cm at 25°C indicating that it is suitable for all purposes. The other constituents like Chloride (14-67 ppm), Nitrate (0.4-10.2 ppm), Sulphate (20-280 ppm), Calcium (25-160 ppm), Magnesium (10-70 ppm), total hardness (TH: 40-185), Potassium (0.4-7 ppm), Silica (3.6-28 ppm) are present within permissible limit for use in different purposes. The Fluoride (F) content in ground water is detected in trace condition in the water samples.

The presence of Arsenic is not reported from the district and further detail survey and analysis of water samples for Arsenic as well as Fluoride will reveal the fact.

Out of the water samples collected for analysis in Cachar district, 43% of samples show higher concentration of Iron beyond its permissible limit of 1 ppm. The iron content in the district varies from 0.05 to as much as 5 ppm and the higher concentration is noticed in Kabaganj, Ujjan, Tarapur, Paila pool, Sadin bazaar, Dayapur, Dwarbond, Panibhora, Rangpur, Phatimora, Chandighat T.G. and Durgakona areas. The high iron content impairs the colour and taste of ground water and adversely affects its use for domestic purposes.

Iron concentration in deeper aquifers is comparatively much lower than the shallow aquifers and it ranges from 0.3 ppm to 1.3 ppm.

(Source: Central Ground Water Board Report, MoWR)



10.5 GEOMORPHOLOGY

The area consists of resistant structural hills in the borders with an elongated valley in the central part. The general trend of the hills is NE-SW. Structural features like hog's back and steep escarpments are commonly present. The valley area comprises of low land with swamps and alluvial flat land. The southern part has number of field depressions and these are permanent water bodies commonly known as 'beel'. The soil of the Silchar city varies from alluvial to lateritic in nature. Texture is generally clayey loam to clay. The pH ranges from 4.5 to 6.0. The river line tracts are found to be loamy to sandy loamy in nature. The hilly tracts are covered by lateritic soil.

10.6 WIND DIRECTIONS

The hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages. The average hourly wind speed in Silchar experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 4.4 months, from January 15 to May 28, with average wind speeds of more than 3.1 miles per hour. The windiest

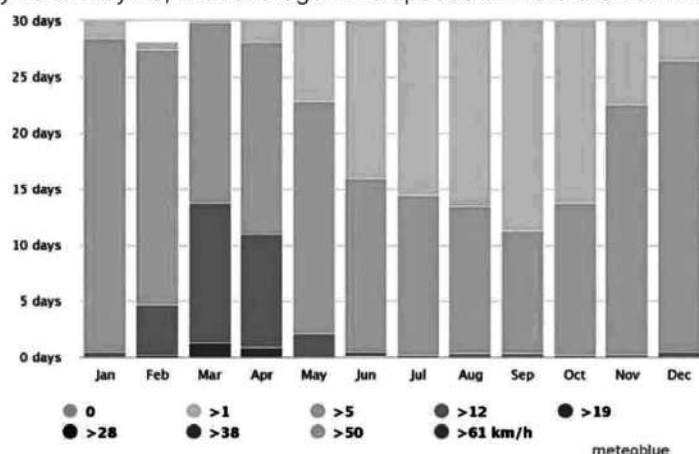


Figure 169 Yearly variation of Wind speed Chart

day of the year is March 21, with an average hourly wind speed of 3.7 miles per hour. The calmer time of year lasts for 7.6 months, from May 28 to January 15. The calmest day of the year is October 5, with an average hourly wind speed of 2.5 miles per hour. The diagram for Silchar shows the days per month, during which the wind reaches a certain speed.

The wind rose for Silchar shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE). Cape Horn, the southernmost land point of South America, has a characteristic strong west-wind, which makes crossings from East to West very difficult especially for sailing boats.

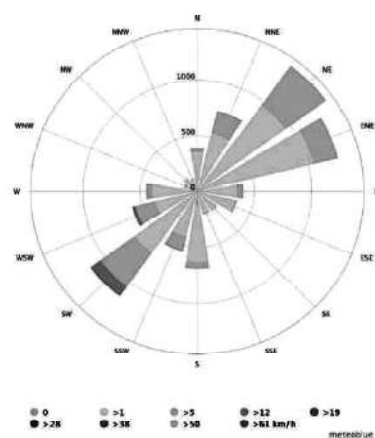


Figure 170 Windrose Diagram showing Wind Direction

10.7 RIVERS

Urbanization has got its own advantages and disadvantages. The main advantage is that it provides scope for provision of common infrastructure facilities. The main disadvantage is that it creates more strain on the natural resources (including land and waterbodies). The environmental consequences of urban growth are considerable. Cities are prolific users of natural resources and generators of wastes. The urban ways of living contribute to relatively more pressure on resources. Migration of people to riverbank creates scattered clusters of settlement which puts enormous pressure on the available water resources. Some of the issues will be water scarcity and water pollution, air pollution, climate and Heat Island Effect, poor management of solid wastes, urban congestion etc. in the system.

Silchar is a geographically potential as three rivers passes through entire Master Plan Area. Barak as main river and Dadra and Badri are tributary river from west and east accordingly.

10.7.1 THE BARAK RIVER

River Barak is of highly meandering nature. The name Barak itself originates from Bodo-Baak (Bodo-Big; Baak- Bends/ meanders). It took its rise a little to the west of Maothana, on the northern boundary of Manipur. Taking a south-west turn from its source near Tipaimukh in Manipur, it then come to north and for a considerable distance formed the boundary line between the region and the state of Manipur. After its junction with the river Jiri, this too for a considerable length, formed the border between Barak valley region and the Manipur. The Barak River valley is represented by a narrow E-W trending elongated alluvial filled basin and is located at the northern edge of N-S trending fold ridges of the Indo-Burma frontal fold belt. The River has undergone substantial changes in its channel position at several places in Barak valley with strong northward shift towards west of Silchar



Figure 171 Barak River through Cachar District

(Das et al., 2007). The entire area of Cachar district is represented by i) unconsolidated, ii) semiconsolidated and iii) consolidated formations. The hydraulic gradient of ground water is from North to South in northern parts and ground water flows from South to North-West in southern parts.



Barak River, Silchar

10.7.1.1 Current Scenario

The river, flowing through Barak valley in southern Assam is of alluvial channel characteristics. The river exhibits several changes through time and space with indications of shifting of channel at various places in the region. The intensely meandering Barak River exhibits

abandonment of several loops and overall northward shift. Consequent upon the frequent river bank cutting and loop abandonment, the habitation and agricultural practices are affected resulting in loss of soils.

Silchar town, a major part of which is encircled by the river, is among one of the busiest town of northeast India and a commercial hub for the states of Tripura, Southern Assam, Manipur, and Mizoram. The river planform characteristics around the town are associated directly with natural hazards such as bank erosion and floods, affecting the social and economic condition of people living in and around Silchar town. Shifting river course on one hand is displacing people from its bank and on the other raises doubts on the stability of river course in extreme flood conditions.

The Barak River (locally known as Avoure) receives a number of tributaries, including the Irang, Makru, Tuivai, Jiri, Gumti, Howrah, Kagni, Senai Buri, Hari Mangal, Kakrai, Kurulia, Balujhuri, Shonaichhari and Durduria. The principal tributaries of the Barak in India are the Irang, Makru, Tuivai, Jiri, the Dhaleshwari (Tlawng), the Singla, the Longai, the Madhura, the Sonai (Tuirial), the Rukni and the Katakhal.

Erosion of banks due to meandering nature of river Barak is a major safety issue in the region threatening households, agricultural lands, and roads. As about half of the town boundary is circumscribed by the meander loop, it is very important to have an idea for the possible ways in which the meander loop will migrate. In the wake of this, the meandering history of the river around Silchar town may throw some light regarding the future probability of migration.

10.7.1.2 Identification of Major Locality around riverbank

Silchar is the major town that belongs to Cachar District is located on the bank of Barak river at down stream of Annapurna Ghat polluted stretch. The major localities identified in and around the catchment areas of polluted stretch of Barak river at d/s of Annapurna Ghat are Silchar, Ramnagar, Masimpur etc Barak river also enters Karimganj district at Panchgram, however, the polluted stretch of the river is not identified across the major populated locality of the district headquarter Karimganj. The major localities identified in and around the catchment areas of polluted stretch of Barak river under Karimganj division are Panchgram, Badarpur etc.

The major town/village responsible for contribution of sewage in the polluted stretches of Barak River are Silchar and Badarpur. The waste generated by Silchar town at Cachar District is approximately 76082.2 KLD and Badarpur at Karimganj district is around 17787.9 KLD.

10.7.1.3 Polluted River Strech



Figure 172 Map showing the polluted river stretch of Barak River at downstream of Annapurna

The length of the polluted stretch of Barak river at downstream of Annapurna Ghat at Silchar is 11km (approx.) with an area of 28.2 sq.km. and the stretch identified as polluted is from Berenga Pt III to Tarapur Pt VII. Silchar is the major town that belongs to Cachar District is located on the bank of Barak river at down stream of Annapurna Ghat polluted stretch. The major localities identified in and around the catchment areas of polluted stretch of Barak river at down stream of Annapurna Ghat are Silchar.

10.7.1.4 Factors Causing Water Pollution

Some natural drainage of local origin and kuchcha nullahs are acting as the drainage system to evacuate sewage originating from domestic households, commercial establishments, institutes, industries etc. Some of the households in the towns are equipped with ordinary septic tanks.

No industrial waste dumped on land or discharged into water bodies/river. Industrial wastes are managed by industries itself. Authorisation have been granted to different industries in line with Water act 1974, Hazardous Waste (Management, Handling and Transboundary Movement) Rule, 2008 as amended. Regular monitoring by PCBA to ensure that the terms and conditions are strictly adhered in accordance with the prescribed standards.



Dumping is carried out unscientifically in the open space. No proper segregation of bio-degradable and non-biodegradable waste. No proper segregation of dry and wet waste. Lack of unscientific disposal facilities/infrastructure technology like decentralized composting or bio-methanation plant, waste to energy plant, solid waste management plant. Dumping is carried out unscientifically in the open space along with the municipal waste. No proper segregation of bio-degradable and nonbiodegradable waste. No proper segregation of dry and wet waste. Lack of unscientific disposal facilities/infrastructure technology like decentralized composting or bio-methanation plant, waste to energy plant, solid waste management plant. Hazardous waste are

managed by hazardous waste generating industries itself by disposing the same through authorised recycler, secured landfill area, Bioremediation etc. PCBA has engaged collection centre for collection of Hazardous waste. Lack of TSDF facility for commonly utilization by hazardous waste generating industries. Segregation at the source under Biomedical waste Management Rules, 1998 as amended. The HCFs have installed ETP for treatment of liquid waste generated. Annual return in (Form-3) is submitted by E-Waste generating units to PCBA from time to time for onwards transmission to CPCB. Most of the e-waste generator have sent their e-waste to their respective manufacturer. There is no authorised recycler, refurbisher, dismantler etc. available to ensure environmentally sound management of E-waste. There is no "facility" wherein the process of dismantling, recycling, and disposal of ewaste are carried out.

(Source: Action Plan For Barak River, PCB Assam)



10.7.1.5 Quantity of Sewage generated

The major town/village responsible for contribution of sewage in the polluted stretches of Barak river is Silchar. The waste generated by Silchar town is approximately 76082.2 KLD.

Table 200 Sewerage Generation Calculation

Sr. No.	Area	Population as per	Water Consumption (KLD) @135lpcd	Sewage Generation (KLD)	No. of STPs proposed	Existing Treatment capacity (KLD)	Gaps in KLD
1	Cachar	7,04,465	95102.8	76082.2	01	Nil	76082.2

(Source: Action plan for Barak river, PCB, Assam)